CROP MANAGEMENT TECHNOLOGIES

USER MANUAL

NMC-JUNIOR

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Introduction

The Netafim **NMC-Junior Climate** process controller manages vents, fans, heaters, screen, CO2, misting, fogging and cooling systems. This manual describes the programming and operating procedures. Prior to using the controller in your facility, you will need to complete its installation, please see Getting started for further instructions.

Once the controller is configured all relevant menus will be available for use.

General Description

- The new and advanced large LCD graphic screen (40x16 lines) makes the **NMC-Junior Climate** user friendly and easy to operate and program.
- The **NMC-Junior Climate** is a flexible controller that can apply to many different applications.
- The Netafim **NMC-Junior Climate** is a top of the line climate controller made of the latest and most updated technology.
- **NMC-Junior Climate** main hardware features:
  - 15 x 24VAC outputs.
  - 6 x digital inputs; Wind Speed, Rain Collector, Rain Detector.
  - 5 x analog inputs; Temperature & Humidity, CO_2.
  - Local or remote communication to PC.

Limitation Table

Device	Max No.	Remarks
Devices		
Vents	7	
Fan groups	4	
Heaters	4	
Thermal screens	2	
Fogging valves	4	
Cooling pad	1	
Misting valves – time schedule	15	
Circulator fans	4	
CO2	1	
Programs		
Humidity treatment process	4	
Special ventilation process	4	
Fresh air treatment	4	
Emergency program	1	
CO2	1	
Wind / Rain program	4	

Operation of NMC-Junior Climate

Operating the NMC-Junior Climate is very simple and defined to be intuitive.

Use the following guideline for easy operation:

- To change specific settings navigate the cursor (flashing underline mark) using the arrows until it is under the relevant setting.
  According to type of field (value, list of options, etc) change setting as follows:
  - **Value** - use the numeric keys to change the value and press ENTER to confirm.
  - **List of Options** - press Enter to open the List of Options, use the arrow keys to navigate and press Enter again to confirm.
  - **HH:MM:SS** - set hours, press the Enter key to move to the minutes, set the minutes, and press the Enter again to move to the seconds.
  - **Factors** - use the left and right arrows to change the factor up and down respectively.
- To erase typing mistakes use the DELETE key.

Remember to confirm changes by pressing the ENTER key or the down-arrow.

If you don't confirm the new value will be lost and the controller will keep the previous value.

1. Climate Program	2. Climate Process	3. History	4. Management	5. Alarm	6. Test	7. Configuration
1.1 Vents	2.1 Humidity Treatment	3.1 Events	4.1 Clock	5.1 Alarm/Fault Reset	6.1 Output	7.1 Outputs Definition
1.2 Fans Operation	2.2 Special Ventilation	3.2 Alarm History	4.2 Calibration	5.2 Faults Setting	6.2 Digital Input	7.2 Relay Layout
1.3 Heating	2.3 CO2	3.3 Sensors History	4.2.1 Temperature Sensors		6.3 Analog Input	7.3 Digital Input
1.4 Screen	2.4 Emergency	3.4 History Setup	4.2.2 RH Sensors		6.4 Sensors	7.4 Analog Input
1.5 Fogging	2.5 Fresh Air Treatment	3.5 Sensors History Erase	4.2.3 CO2 Sensors		6.4.1 Temperature Sensors	7.5 Temperature Setting
1.6 Cooling Pad		3.6 Rain Collect History	4.2.4 Weather Sensors		6.4.2 RH Sensors	7.6 Wind Program
1.7 Misting			4.3 Language			7.7 Vents Operation
1.8 Circulators			4.4 Save to Data Plug			7.8 General Setting
			4.5 Read from Data Plug			7.8.1 Set Parameters
			4.6 Custom. Main Screen			7.8.2 Circulators
			4.6.1 Sensors			7.8.3 Weather Sensor Set
			4.6.2 Active			

Table 1: Menu structure table

Main Menu Screen

Press the MENU key until you reach the Main Menu screen.

The main menu screen consists of 5 parts (see **Figure 1**):

1. Sensors - section of the screen shows individual sensors reading. Sensors showing are defined by the user on table **4.6** Management/Customize main screen (see **Table 1**).
2. Inside – this section shows average inside temperature and humidity.
3. Active – this part shows active outputs.
4. Status – this section shows general information, such as time and date, and active climate processes.
5. Messages – this section shows blinking messages, if more than one exist they appear in turn.

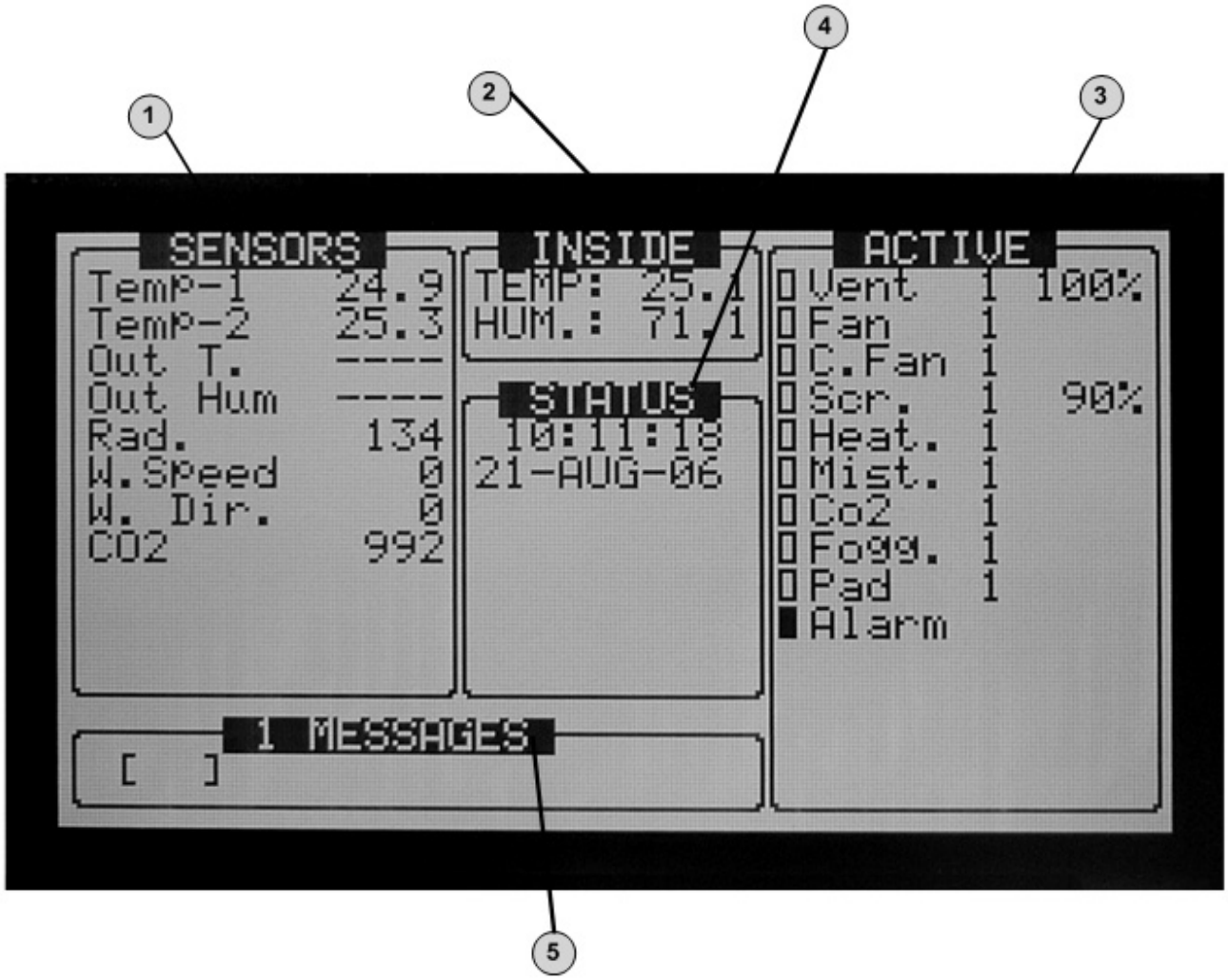


Figure 1: Main menu screen

Use of the keypad

Figure 2 illustrates the keypad structure.

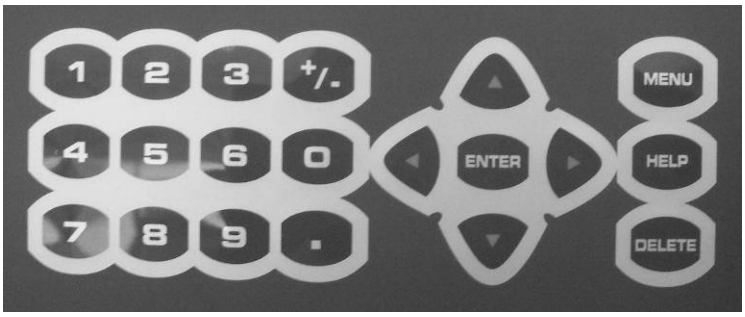


Figure 2: Keypad picture

Keypad buttons usage

Available keys are summarized in **Table 2**.

Help	Using the ***Help*** key you can access help screens and graphs. If not indicated otherwise press the 'Menu' key to exit the 'Help' menu.
Menu **(Back)**	The ***Menu*** key is used to exit screens and menus you are currently in. When in the main menu screen pressing the ***Menu*** key will enter the hot key screens.
Delete	The ***Delete*** key enables to erase typing mistakes.
Arrow	The ***Arrow*** keys move the cursor around the menus and in some cases can be used to change values.
+/- Key	The **'+/-'** key changes between positive and negative values and marks the check boxes when selecting options. In the History screen the '+/-' key can be used to change between quantities and time format.
'.' Key	The **'.'** Key enables to enter a decimal point.
Numbers	The ***Numeric*** keys enable you to enter numbers and make selections in the numbered menus. Several of the numeric keys perform special Hot Key functions.
Enter	The ***Enter*** key acknowledges your entry or menu selection.

Table 2: Keypad buttons summary

Software

Getting Started

This paragraph briefly explains how to get started with the NMC-Junior Climate software setup procedure. For further explanations please see detailed instructions per table.

For initial setup of the controller start with menu **4** - Management. Later steps might depend on earlier ones; therefore it is essential to go through all the steps.

Table 3 may be used for assistance.

Table #	Table Description	
Management		
4.1	Clock	Set your local time and date. Define day and night times, default day is 6:00 to 18:00, default night is 18:00 to 6:00.
4.3	Language	Select your preferred language.
Configuration		
7.1	Outputs Definition	Assign functions according to equipment in your greenhouse. Any change to this table will prompt a Relay Layout save settings window. You can either pick auto, manual or cancel. "Auto", means that the controller automatically assigns the relay layout. "Manual" means that the relay layout is assigned manually by the user in the relay layout menu.
7.2	Relay Layout	Assign an output (Relay) to each device.
7.3	Digital Input	Define a digital input that matches its sensor (Wind Speed, Rain).
7.4	Analog Input	Define an analog input that matches its sensor (Temperature, Humidity, etc)
7.5	Temperature setting	Configure temperature sensors to the functions.
7.6	Wind Program	
7.7	Vents operation	Set vents operation parameters such as opening time, % per step, etc'.
7.8	General Setting	Set general settings such as temperature units, PC communication, circulators operation, weather station sensors to log, etc'.

Table #	Table Description	
Test		
6.1	Output (relay)	Verify the functionality of each output / device by pressing the right arrow key.
Climate program		
1.1	Vents	Define day and night temperatures to open vents. Define day and night differentials from target temperatures.
1.2	Fans operation	Define day and night operation temperature, differential to stopping temperature, outside low stopping temperature border, outside high humidity border. Define fan operation temperature; differential to stop temperature while cooling cell is active. Define fan activity while humidity treatment, circulators, fresh air treatment, special ventilation and CO2 enrichment are active.
1.3	Heating	Define day and night operation temperatures, and differential to stopping temperature. Set start time, end time and operation temperature for each heater. Define heater activity during fan operation, misting, humidity treatment and CO2 enrichment.
1.4	Screen	Define screen operation hours, whether should be operated either according to temperature, radiation or according time.
1.8	Circulators	Define circulators operation time, day and night start triggers, etc'.

Table 3: Getting started summary

1. Climate Program

When main menu screen appears place the cursor on the first row, Climate program (see **Figure 3**) and press enter. You can also reach the menu by pressing the number indicated next to the program. Note that the menu list is provided in **Figure 4**.

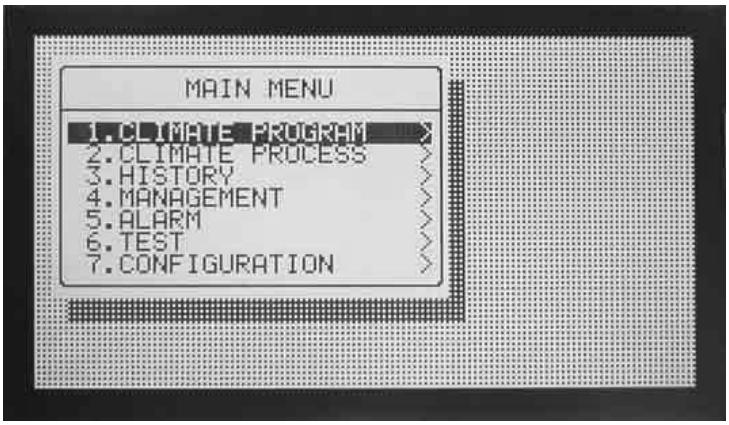


Figure 3: Climate Program selection screenshot

Figure 4: Climate Program menu list screenshot

	To enter any of the menus, press the corresponding numeric key or scroll to the desired item using the up/down arrows keys and press enter; a new window will appear. The first menu under CLIMATE PROGRAM is VENTS.

1.1 Vents

This option enables the user to define a ventilation program setting the following parameters (see **Figure 5**):

- **DAY t º START OPEN** – Temperature to open the vent at day time.
- **DIFF. DAY / NIGHT FOR FULLY OPEN** – Select the differential temperature to fully open vents. The differential value keeps the system balanced. ***Example:*** At a temperature of 20°C the vent will be closed. At a temperature of 30°C the vent will be fully opened (100%). If the temperature is 21°C then the vent will partially open to 10%. Likewise, at 27°C the vent will open to 70%.
- **NIGHT t º OPEN** – Temperature to open vents at night time.
- **HUMIDITY INFLUENCE** – Humidity influence for vent opening. When set to **NO,** the humidity influence is disabled. When set to **YES,** the Day/Night humidity influences on the set point temperature can be defined.
  - There are four points of humidity percentages in the day influence and four for night influence that need to be defined with the corresponding temperature difference to be set.

See table **7.7** Vents Operation (see **Table 1**) for further explanations.

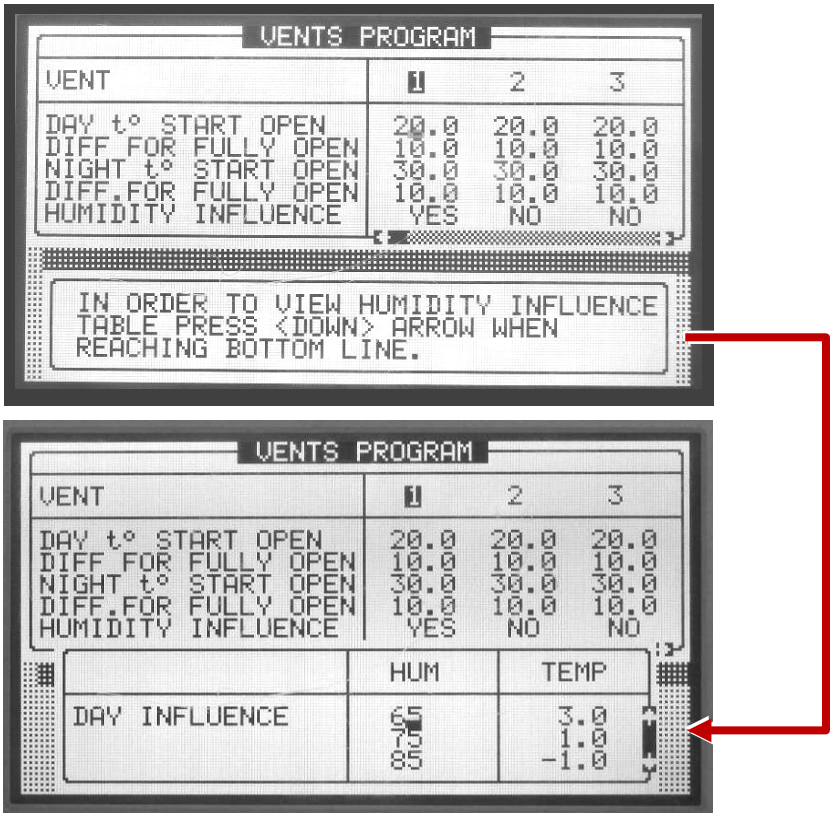

VENTS PROGRAM
VENT 1 2 3
DAY t° START OPEN 20.0 20.0 20.0
DIFF FOR FULLY OPEN 10.0 10.0 10.0
NIGHT t° START OPEN 30.0 30.0 30.0
DIFF.FOR FULLY OPEN 10.0 10.0 10.0
HUMIDITY INFLUENCE YES NO NO
IN ORDER TO VIEW HUMIDITY INFLUENCE TABLE PRESS <DOWN> ARROW WHEN REACHING BOTTOM LINE.
VENTS PROGRAM
VENT 1 2 3
DAY t° START OPEN 20.0 20.0 20.0
DIFF FOR FULLY OPEN 10.0 10.0 10.0
NIGHT t° START OPEN 30.0 30.0 30.0
DIFF.FOR FULLY OPEN 10.0 10.0 10.0
HUMIDITY INFLUENCE YES NO NO
HUM TEMP
DAY INFLUENCE 65 3.0
75 1.0
85 -1.0

Figure 5: Vents Program screenshot

1.2 Fans Operation Program

The NMC-Junior Climate is designed to control a large number of fans. That's why the Fans Operation Program controls groups of fans rather than single fans. You can program up to 4 groups of fans, a single output for each group. **Figures 6-7** illustrate a Fan Operation Program with two groups.

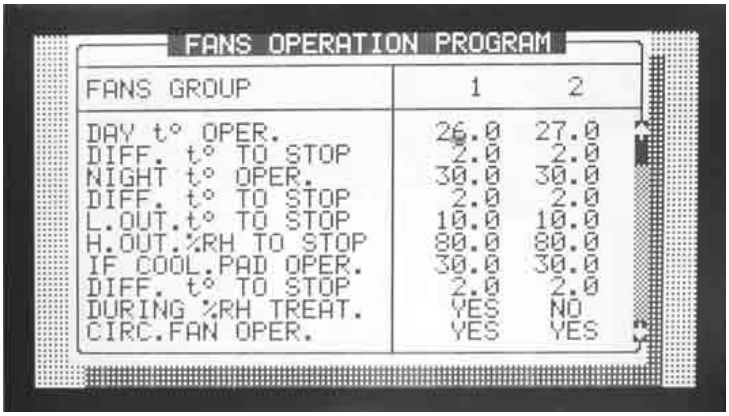

FANS OPERATION PROGRAM
FANS GROUP 1 2
DAY t° OPER. 26.0 27.0
DIFF. t° TO STOP 2.0 2.0
NIGHT t° OPER. 30.0 30.0
DIFF. t° TO STOP 2.0 2.0
L.OUT.t° TO STOP 10.0 10.0
H.OUT.%RH TO STOP 80.0 80.0
IF COOL.PAD OPER. 30.0 30.0
DIFF. t° TO STOP 2.0 2.0
DURING %RH TREAT. YES NO
CIRC.FAN OPER. YES YES

Figure 6: Fans Operation Program screenshot – part 1

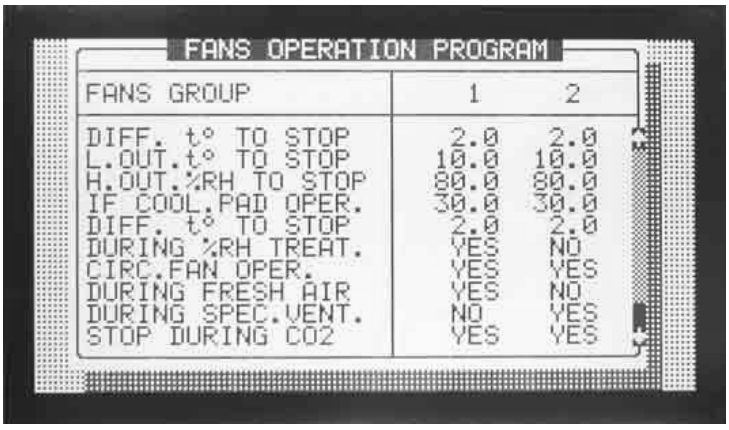

FANS OPERATION PROGRAM
FANS GROUP 1 2
DIFF. t° TO STOP 2.0 2.0
L.OUT.t° TO STOP 10.0 10.0
H.OUT.%RH TO STOP 80.0 80.0
IF COOL.PAD OPER. 30.0 30.0
DIFF. t° TO STOP 2.0 2.0
DURING %RH TREAT. YES NO
CIRC.FAN OPER. YES YES
DURING FRESH AIR YES NO
DURING SPEC.VENT. NO YES
STOP DURING CO2 YES YES

Figure 7: Fans Operation Program screenshot – part 2

The parameters are explained below.

- **DAY t º OPER** – Day time temperature to initiate fan group activity.
- **DIFF. t º TO STOP** –
- **L.OUT t º TO STOP** – Stop fans below this outside temperature.
- **H.OUT %RH TO STOP** – Stop fans above this outside humidity.
- **IF COOL PAD OPER.** – The temperature to initiate fan group activity while cooling pad process is active.
- **DIFF. t º TO STOP** – Differential to stop fans operation.
- **DURING %RH TREAT** – YES/NO to fan operation during humidity treatment.

- **CIRC.FAN OPER** – YES/NO to fan operation during circulators.
- **DURING FRESH AIR** – YES/NO to fan operation during fresh air treatment.
- **DURING SPEC**. **VENT** – YES/NO to fan operation during special ventilation.
- **STOP DURING CO2** – YES/NO to fan operation during CO2 enrichment.

Example 1: It is day time and the inside temperature starts to increase. According to the values in the table above, fan group 1 will begin operating at 26 ºc fan group 2 will begin operating at 28 ºc. If the temperature was to decrease to 25.5ºc only fan group 2 would stop, since in both groups the differential from target temperature is set to 1ºc. Thus, in group 1 the differential is 0.5ºc (26-25.5=0.5) which is smaller than 1 meaning fan operation will continue. In group 2 the target temperature is set to 28 ºc, meaning the differential is above 1ºc and therefore fan operation will stop.

1.3 Heating

The heating program table (see **Figures 8-9**) can be divided into three parts. The first three lines are the day and night operation temperatures. The next section (the following 12 lines) is made up of four heating programs according to set time frame and set point temperature. This feature enables you to control your greenhouse temperature more efficiently and to a better resolution. If you don't program the time frame programs, heaters will activate according to the day and night heating program. The third section of the table is the heating program interface to other climate process, such as: fans operation, misting, humidity treatment and CO2 enrichment.

- **HEATER No.** – Heater's defined in outputs definition table **7.1** (see **Table 1**). It is possible to connect up to four heaters maximum.
- **DAY t º OPER.** – Set the day time temperature to initiate heater activity.
- **NIGHT tº OPER.** – Set the night time temperature to initiate heater activity.
- **START TIME (1…4)** – The heater will start working at this hour (HH:MM) only if the greenhouse temperature goes below t º to operate.
- **END TIME (1…4**) – The heater will stop working at this hour (HH:MM).
- **t º TO OPER (1…4**) – The heater will start operation at this temperature and within the defined time frame. Value can be as low as (-20)°C.
- **STOP DURING FAN/MIST/%RH/CO2** – select yes/no to stop heaters activity during, fan operation, misting, humidity treatment and CO2 enrichment.

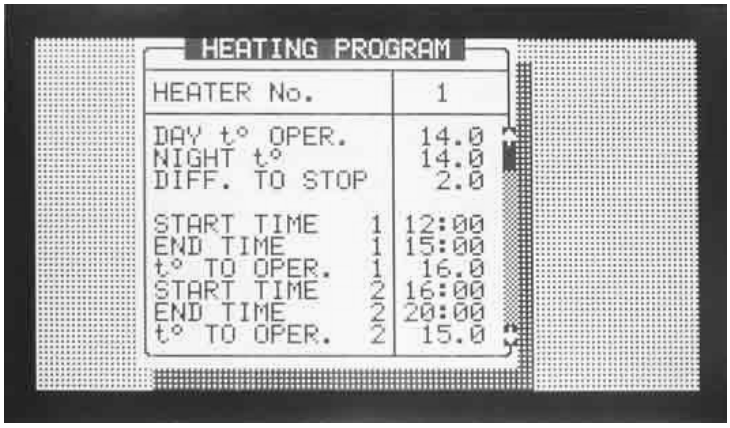


Figure 8: Heating Program screenshot – part 1

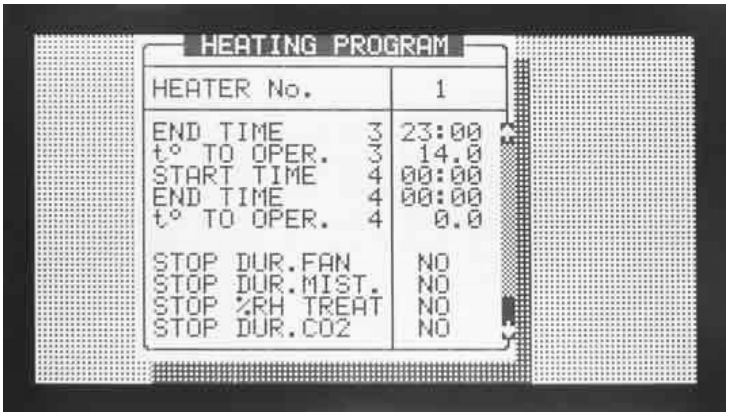


Figure 9: Heating Program screenshot – part 2

1.4 Screen

The thermal screen is an integral part of your greenhouse's climate control. The thermal screen (see **Figures 10-12**) can help the heating process and the cooling process. For example, if it is winter and you want to maintain the greenhouse temperature, spreading the thermal screen will help you warm up your greenhouse, since the area to heat decreases. In the summer when temperatures get higher, and the sun radiation increases spreading the thermal screen will help you maintain radiation protection and a constant temperature.

	Programming definitions of the thermal screen can be done either by sensors connected to the system, or by a time frame definition. The time frame definition has the priority to the sensors' readings (see example).

- **OPERATE BY** - Select method by which you want the thermal screen to function. Temperature or Radiation.

- **FULL SPREAD ABOVE** – Select above which temperature / radiation level you want a full spread of the thermal screen.
- **FULL ROLL UP BELOW** - Select below which temperature / radiation level you want a full roll up of the thermal screen.
- **SPREAD / ROLL UP DELAY** – Set the number of seconds you want the program to wait before initiating spreading or rolling up of the thermal screen. This feature enables more precise control. For example if a passing cloud happens to block the radiation sensor, the delay time prevents a sudden action.

- **OPERATE BY TIME** – As mentioned earlier, the time program is prior to the sensors reading program.
  - **SPREAD START** – Set thermal screen spreading initiation time. Keep in mind to enter the hour in 24h format.
  - **SPREAD END** – Set thermal screen spread end time. The screen should be fully spread by this exact time.
  - **ROLL UP START** - Set thermal screen roll up initiation time.
  - **ROLL UP END** – Set thermal screen roll up end time. The screen should be fully rolled up by this exact time.
- **SCREEN SETTING** – Technical definitions of the thermal screen.
  - **FULL TIME MOTOR OPER.SEC** – Set the time it takes the thermal screen's motor to fully open the screen.
  - **% PER STAGE** – Set the thermal screen's movement percentage per stage. If you want the screen to open or close in one stage or movement set this parameter to 100%. If you want the thermal screen to move in two stages set this parameter to 50%. The default setting is 33%, which means the thermal screen opens and closes in three stages.
    - **MAXIMUM % SPREAD DAY / NIGHT**– Set the thermal screen's day time maximum spread percentage.
    - **ROLL UP AFT.HEAT.(MM:SS)** – Set the delay time after the heater is not active for vent to roll up.
    - **SETTING PROCESS** – Define the thermal screen activity during the different climate

processes. Spread during heating, roll up during fans operation/spray/co2.

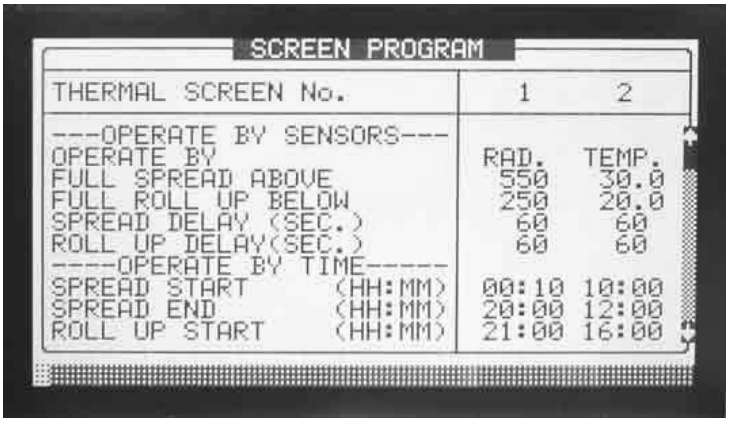

SCREEN PROGRAM
THERMAL SCREEN No. 1 2
---OPERATE BY SENSORS---
OPERATE BY RAD. TEMP.
FULL SPREAD ABOVE 550 30.0
FULL ROLL UP BELOW 250 20.0
SPREAD DELAY (SEC.) 60 60
ROLL UP DELAY(SEC.) 60 60
----OPERATE BY TIME-----
SPREAD START (HH:MM) 00:10 10:00
SPREAD END (HH:MM) 20:00 12:00
ROLL UP START (HH:MM) 21:00 16:00

Figure 10: Screen Program screenshot – part 1

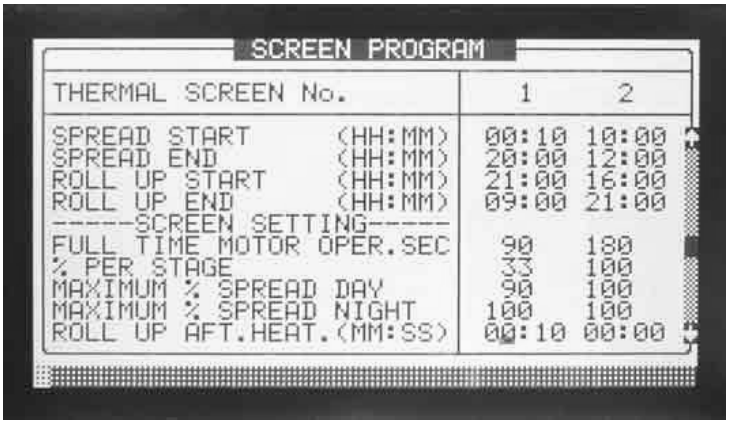

SCREEN PROGRAM
THERMAL SCREEN No. 1 2
SPREAD START (HH:MM) 00:10 10:00
SPREAD END (HH:MM) 20:00 12:00
ROLL UP START (HH:MM) 21:00 16:00
ROLL UP END (HH:MM) 09:00 21:00
-----SCREEN SETTING-----
FULL TIME MOTOR OPER.SEC 90 180
% PER STAGE 33 100
MAXIMUM % SPREAD DAY 90 100
MAXIMUM % SPREAD NIGHT 100 100
ROLL UP AFT.HEAT.(MM:SS) 00:10 00:00

Figure 11: Screen Program screenshot – part 2

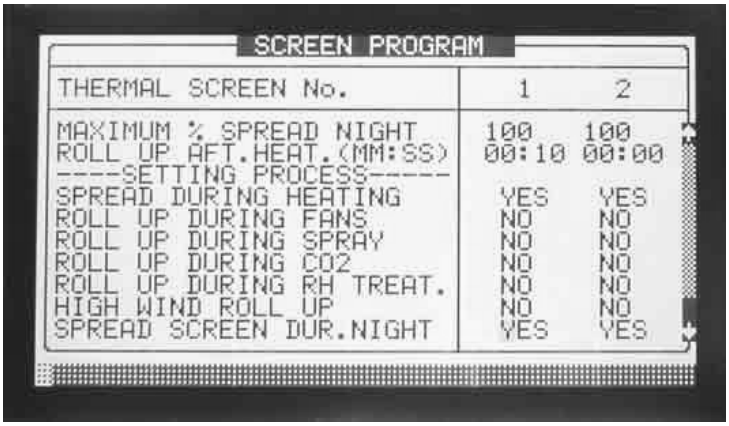

SCREEN PROGRAM
THERMAL SCREEN No. 1 2
MAXIMUM % SPREAD NIGHT 100 100
ROLL UP AFT.HEAT.(MM:SS) 00:10 00:00
----SETTING PROCESS-----
SPREAD DURING HEATING YES YES
ROLL UP DURING FANS NO NO
ROLL UP DURING SPRAY NO NO
ROLL UP DURING CO2 NO NO
ROLL UP DURING RH TREAT. NO NO
HIGH WIND ROLL UP NO NO
SPREAD SCREEN DUR.NIGHT YES YES

Figure 12: Screen Program screenshot – part 3

1.5 Fogging

This selection allows the user to set a fogging program (see **Figure 13**). The parameters are explained below.

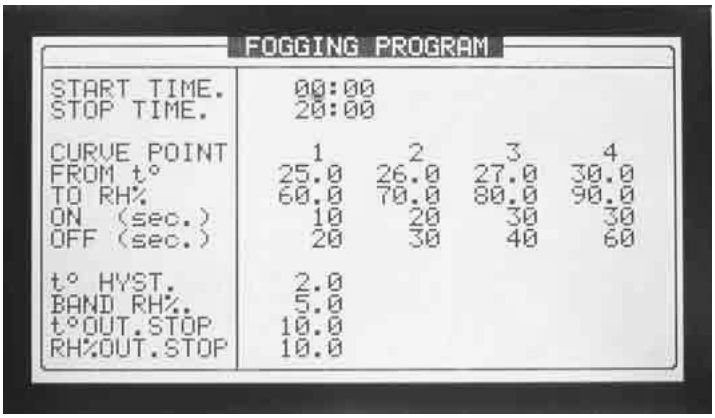

FOGGING PROGRAM
START TIME. 00:00
STOP TIME. 20:00
CURVE POINT 1 2 3 4
FROM t° 25.0 26.0 27.0 30.0
TO RH% 60.0 70.0 80.0 90.0
ON (sec.) 10 20 30 30
OFF (sec.) 20 30 40 60
t° HYST. 2.0
BAND RH%. 5.0
t°OUT.STOP 10.0
RH%OUT.STOP 10.0

Figure 13: Fogging Program screenshot

- **START – STOP TIME** (hh:mm) – Set the time for fogging to start and stop.
- **CURVE POINT** – There are four curve points. Program the settings for each column.

There are 4 columns on the table and they serve as backup programs in case each prior program is not sufficient enough. The example on the table shows that the second column has a higher start temperature and a longer cycle with a longer ON time and a shorter OFF time, which means a more aggressive treatment. The Controller can calculate the average OFF time in between temperatures on each column and operate according to them.

- **FROM tº** - Fogging will start at this temperature.
- **TO RH%** - Humidity target. Fogging will stop above this humidity level.
- **ON/OFF** (sec.) – Set the fogging work cycle. For example: 5 seconds on and 30 seconds off is a 35 second cycle with 5 seconds operation and 30 seconds rest.
- **tº HYST** – Differential below target temperature.
- **BAND RH%** - The humidity percentage range above and below the curve settings for fogging. The band is a differential above and below set temperature.
- **t ºOUT.STOP** – Stop fogging below this outside temperature.
- **RH%OUT.STOP** – Stop fogging above this outside humidity.

1.6 Cooling Pad

This option enables the user to define a cooling pad program (see **Figure 14**).

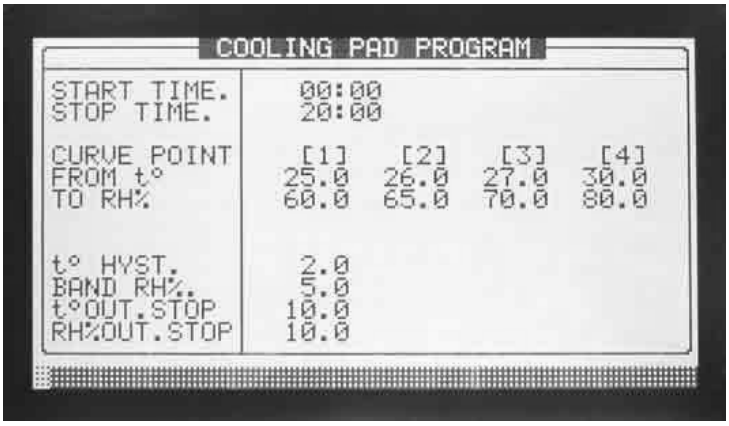
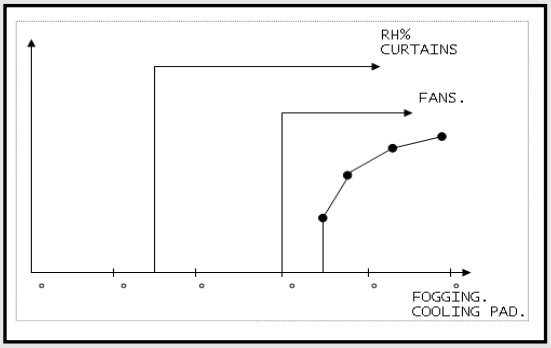


Figure 14: Cooling Pad Program screenshot

This program consists of the following parameters:

- **START – STOP TIME** (HH:MM) – Set the time for cooling to start and stop.
- **CURVE POINT** – There are four curve points. Program the settings for each column.
- **FROM tº** - Cooling pad will start at this temperature.
- **TO RH%** - Stop Cooling pad above this humidity level.
- **tº HYST** – Differential below target temperature.
- **BAND RH%** - The humidity percentage range above and below the curve settings for cooling pad activation. The band is a differential above and below set temperature.
- **t ºOUT.STOP** – Stop cooling pad below this outside temperature.
- **RH%OUT.STOP** – Stop cooling pad above this outside humidity.

There are 4 columns on the table and they serve as backup programs in case each prior program is not sufficient enough. The example on table 1.6 shows that the second column has a higher start temperature and a higher humidity level with it. The cooling pad will operate constantly at any time the humidity level in the greenhouse will be lower than the one set for the current temperature. The controller calculates the level of humidity between columns as shown in the graph:



1.7 Misting

This choice allows the user to program up to 40 misting program a day (see **Figure 15**).

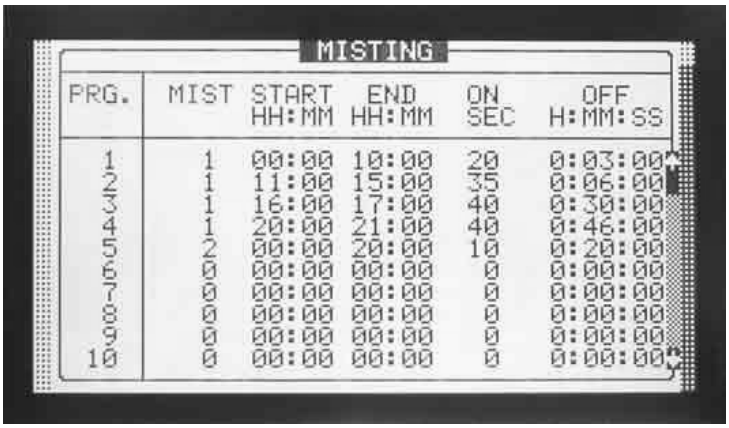


Figure 15: Misting screenshot

The parameters are as follows:

- **PRG.** – Program number column. There are up to 40 misting programs, defined by time frame and on off cycles.
- **MIST** – Set the mist number, one mist can be defined for different programs.
- **START/END** (HH:MM) – Start and end times (time frame) during which misting is active according to the on/off cycle.
- **ON** (SEC) – Set the number of seconds for mist operation.
- **OFF** (HH:MM:SS) – Set the mist rest period.

1.8 Circulators

This selection causes the temperature in the greenhouse is be even everywhere. There are up to 4 fans and 3 time periods for each fan. The parameters are explained below (see **Figure 16-17**).

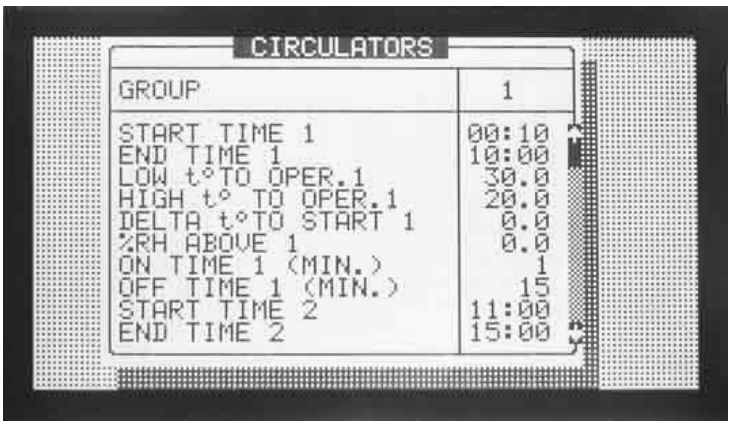


Figure 16: Circulators screenshot – part 1

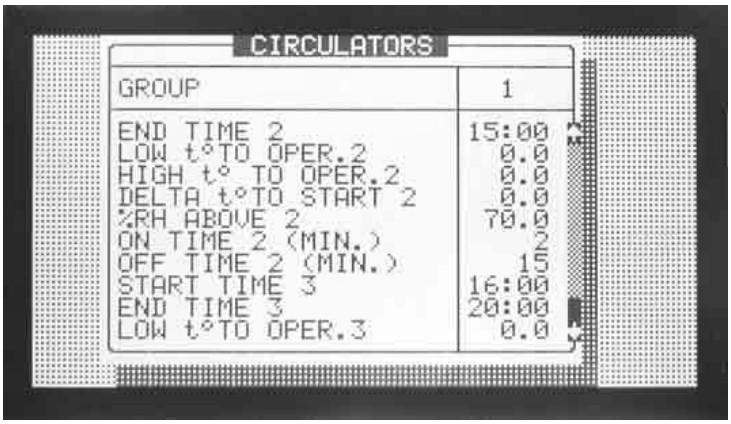


Figure 17: Circulators screenshot – part 2

- **GROUP** – Circulators group, according to 7.1 Output Definition table.
- **START/END TIME** (1…3) – Set the start end times for each fan group.
- **HIGH/LOW t º TO OPER.** – Set temperature range of operation.
- **DELTA t º TO START** –The delta value is the difference in temperature readings from two different sensors inside the greenhouse. Set a delta value to initiate circulation in the greenhouse

	Note: The circulator program functions according to either time setting or the temperature and humidity set points, but not both.

- **%RH ABOVE 1** – Set the humidity value above which circulator activity will commence.
- **ON TIME (Min.)** – Set operation time in minutes.
- **OFF TIME (Min)** –Set pause time in minutes.
- **t º HYSTERESIS** – The temperature hysteresis works like a two sided differential. When circulators are working and the temperature drops below low temperature operation, stopping point will be at low temperature minus hysteresis value. If temperature rises stopping temperature will be at high temperature plus hysteresis value.
- **RH% HYSTERESIS** – Set humidity hysteresis value. In this case if humidity level drops below the RH% above value, stopping humidity point will be at RH% minus RH% hysteresis value.

2. Climate Process

Figure 18 shows the dark highlighting on "1.HUMIDITY TREATMENT" indicates that this option is selected. If you press Enter at this point, the NMC-Junior Climate will take you to the Humidity Treatment Menu. You can choose a different menu by using the arrow keys.

Alternatively, you can press the indicated numeric key by each item. For example, pushing the '4' key here will take you directly to the Emergency Menu.

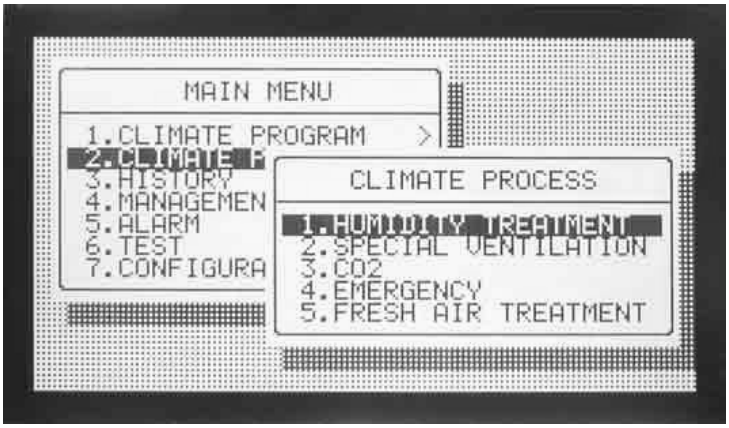


Figure 18: Climate Process menu screenshot

2.1 Humidity Treatment

This option is based on table **1.2** (see **Table 1**) whereas here it is an opposite vent opening (see **Figure 19**).

HUMIDITY TREATMENT
PROGRAM 1 2
START TIME 00:00 06:00
END TIME 05:00 20:00
HIGH.%RH TO START 60 70
%RH DIFF.TO STOP 5 5
ON TIME (min.) 10 15
OFF TIME (min.) 30 60
INSIDE LOW t° TO STOP 10.0 10.0
OUTSIDE LOW t° TO STOP 10.0 10.0

Figure 19: Humidity Treatment screenshot

- **PROGRAM** (1…4) – Program number row, you can set up to four humidity treatment programs.
- **START/END TIME** – Start and end times (time frame) during which humidity treatment is active.

- **HIGH %RH TO START** – Set humidity level set point. Above this humidity level humidity treatment will commence.
- **%RH DIFF. TO STOP** – Set differential value (see example).
    - **Example**: if you set a humidity level of 70% and a differential of 5%, the humidity treatment will start only if the humidity level in the greenhouse rises over 70% but will go off only when the level lowers to 65%. In order to reduce the humidity in the greenhouse, need to start power ventilation.
    - Opens the vent that is opposite to the opening percentage defined in table 7.6. This operates the group of fans as in table 1.2, when 'Yes' is selected in this process. This continues during 'ON' time and in the end of this process it returns the vents and fans to their previous state (closed or opened greenhouse).
- **ON/OFF TIME (min.)** – Set the humidity level work cycle in minutes.
- **INSIDE/OUTSIDE LOW t º TO STOP** – Set value to stop humidity treatment, if inside or outside temperatures drop below set point.

2.2 Special Ventilation

The main purpose of the special ventilation program is to renew the air within the greenhouse. As seen in **Figure 20**, the special ventilation program does not consider humidity levels. Special ventilation utilizes fans, together with vents. Note that there are up to 4 special programs. Their parameters are as follows:

- **START TIME** - The ventilation commencement operation time. Opens the vent that is opposite to the opening percentage defined in table 7.6. This operates the group of fans as in table 1.2, when 'Yes' is selected in this process. This continues during 'Work Time' and in the end of this process it returns the vents and fans to their previous state (closed or opened greenhouse).
- **WORK TIME** – Work duration, in minutes.
    - **Example:** according to the table above, the special ventilation will start at 09:00, work for 15 minutes and stop until the next start time. In this case the next start time is 15:00.
- **INSIDE/OUTSIDE.LOW tº TO STOP** – Set the inside/outside low temperature for special ventilation to stop working. This definition is more of a safety boundary.

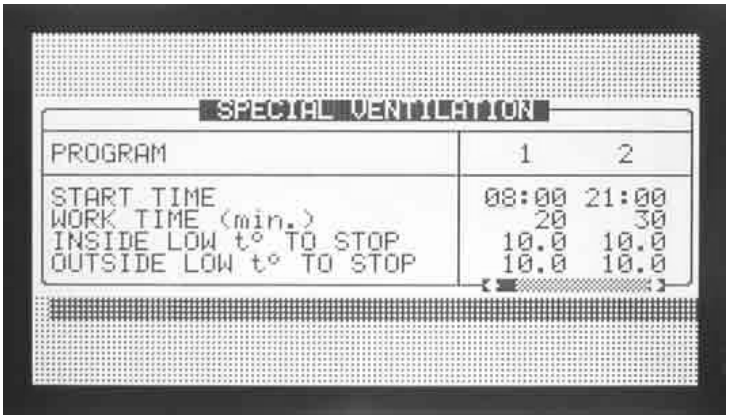


Figure 20: Special Ventilation screenshot

2.3 CO2 Program

This option enables the user to program the amount of CO2 (see **Figure 21**). The parameters are explained below.

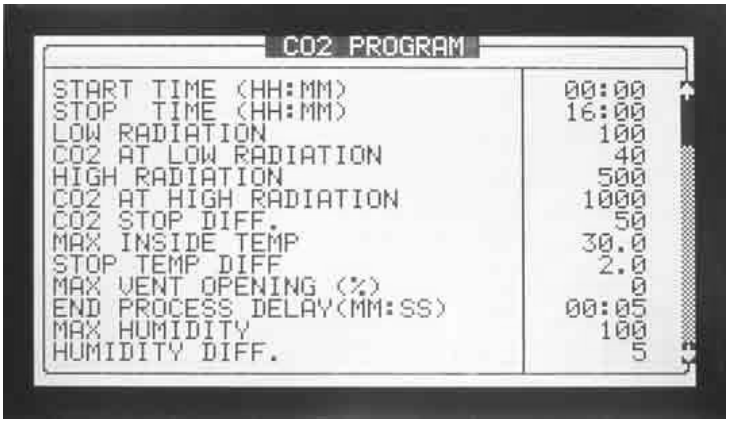


Figure 21: CO2 Program screenshot

- **START TIME (HH:MM)** – Set the time of day for CO2 treatment to begin.
- **END TIME (HH:MM)** – Set the time of day for CO2 treatment to terminate.
- **LOW RADIATION** – Low radiation point to start the CO2 process.
- **CO2 AT LOW RADIATION** – The amount of CO2 at low radiation point.
- **HIGH RADIATION** – High radiation point to start the CO2 process
- **CO2 AT HIGH RADIATION** – The amount of CO2 we want in the high radiation point
- **CO2 STOP DIFF** – Set the differential of the CO2 in order to avoid clicking the relay.
- **MAX INSIDE TEMP** – Set the maximum inside temperature border, above which process will not initiate.

- **STOP TEMP DIFF**. – Set differential value to stopping temperature. CO2 treatment will terminate at Max temperature value plus this value.
- **MAX VENT OPENING (%)** – Set the vents' maximum opening percentage.
- **END PROCESS DELAY (MM:SS)** – Set a delay time to end the process.
- **MAX HUMIDITY** – Set maximum humidity border during the process.
- **HUMIDITY DIFF** – Set humidity differential level.
- **MAX OUT TEMP** – Set the maximum outside temperature border, above which process will not initiate.
- **MAX WIND SPEED** – Set the maximum outside wind speed border, above which process will not initiate.
- **MINIMUM ON TIME (MM:SS)** – Minimum CO2 treatment operation time.
- **MINIMUM OFF TIME (MM:SS)** - Process minimum off time.

	The CO2 treatment operates only between set start and end times. The CO2 enrichment level is set according to the radiation level; by setting high and low radiation borders with relative high and low CO2 enrichment levels. Below the low level of radiation, and above the high level, process will not commence. The NMC – Junior sets a linear line between the low and the high radiation set points and activates the CO2 according to the radiation level detected. High outside temperature, high inside temperature, high inside humidity or high wind speed can stop the process. The process will be activated by a set cycle as long as the CO2 level is below the programmed line. When the level is sufficient the process will stop.

2.4 Emergency

Figure 22 presents the screenshot after selection this option. The parameters are explained below.

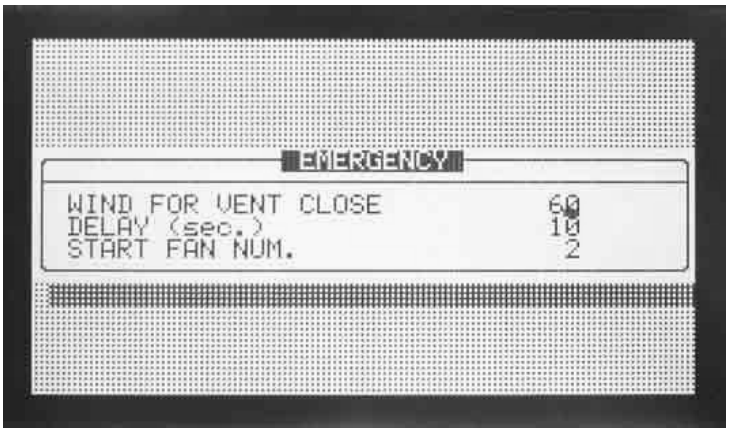


Figure 22: Emergency screenshot

- **WIND FOR CURT.CLOSE** – Set the emergency wind speed, for vents to close.
- **DELAY (sec.)** – Set delay time from time of detection of emergency wind speed, until closing the vents. The delay time ensures that there has been a steady wind speed increase, not just an isolated gust.
- **START FAN NUM.** – Select which fan group will operate while vents are closed.

2.5 Fresh Air Treatment

Figure 23 shows the screenshot after selection this option. The parameters are explained below.

This program is meant to change the air in the greenhouses using power ventilation. For instance, **Figure 23** demonstrates that starts operating from 00:00 to 05:00 in the morning every interval of 20 minutes the ventilation operates of a total of 10 minutes. This option opens the vent that is opposite to the opening percentage defined in table 7.6. This operates the group of fans as in table 1.2, when 'Yes' is selected in this process. This continues during 'Min. ON' time and in the end of this process it returns the vents and fans to their previous state (closed or opened greenhouse).

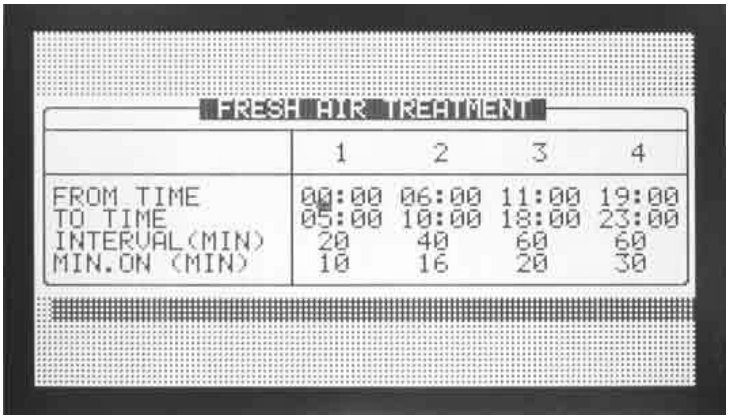


Figure 23: Fresh Air Treatment screenshot

- **FROM/TO TIME** (HH:MM)**:** Set the time of day for treatment to start and end (time frame).
- **INTERVAL (MIN):** Set rest time period between 'ON' times.
- **MIN. ON (MIN):** Set actual work time in minutes.

3. History

The history menu provides extensive information regarding measurements and processes done by the NMC-Junior Climate (see **Figure 24**).

Figure 24: History menu screenshot

3.1 Events

This selection provides information of all the processes performed by the NMC-Junior Climate including their time and date. Note that this table consists of 150 last events (see **Figure 25**).

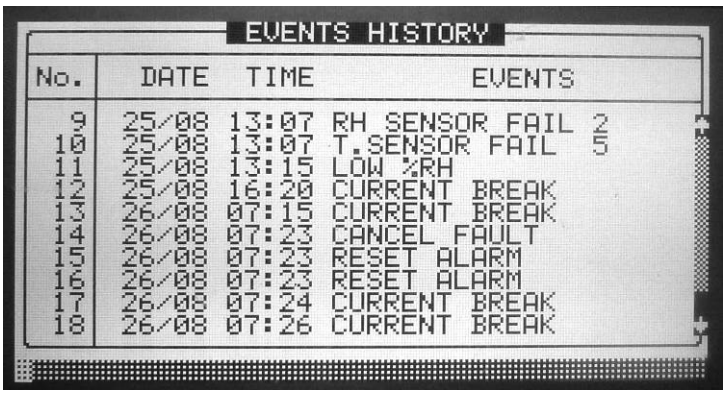

EVENTS HISTORY
No. DATE TIME EVENTS
9 25/08 13:07 RH SENSOR FAIL 2
10 25/08 13:07 T.SENSOR FAIL 5
11 25/08 13:15 LOW %RH
12 25/08 16:20 CURRENT BREAK
13 26/08 07:15 CURRENT BREAK
14 26/08 07:23 CANCEL FAULT
15 26/08 07:23 RESET ALARM
16 26/08 07:23 RESET ALARM
17 26/08 07:24 CURRENT BREAK
18 26/08 07:26 CURRENT BREAK

Figure 25: Events History screenshot

3.2 Alarm History

This option provides every alarm that took place from the last cold start is recorded. A blinking alarm is still active. Alarm number 1 is the last alarm to occur. Note that t he table consists of 50 last alarms (see **Figure 26**).

ALARM HISTORY
No. DATE TIME FAULT
1 25/08/06 13:06 RAD. FACTOR 0
2 25/08/06 13:07 T.SENSOR FAIL 01
3 25/08/06 13:07 T.SENSOR FAIL 02
4 25/08/06 13:07 T.SENSOR FAIL 03
5 25/08/06 13:07 T.SENSOR FAIL 04
6 25/08/06 13:07 T.SENSOR FAIL 05
7 25/08/06 13:07 RH SENSOR FAIL11
8 25/08/06 13:07 RH SENSOR FAIL12
9 25/08/06 13:07 T.SENSOR FAIL 05
10 25/08/06 13:15 LOW %RH 03

Figure 26: Alarm History screenshot

3.3 Sensors History

This selection (see **Figure 27-28**) shows the sensors history readings according to the settings in the History Setup table **3.4** (see **Table 1**).

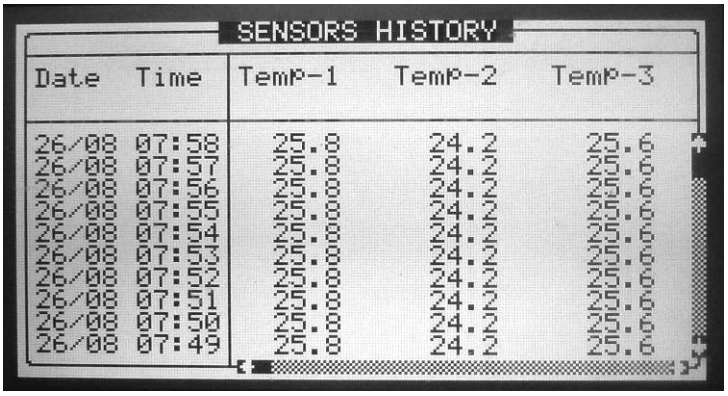


Figure 27: Sensors History screenshot – part 1

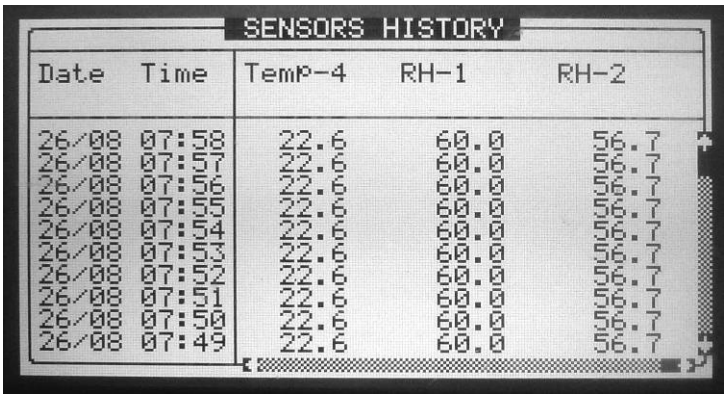


Figure 28: Sensors History screenshot – part 2

3.4 History Setup

Use the up/down arrow keys to scroll the screen. Mark a '√' using the '+/-' key to activate data collection (see **Figures 29-31**).

Figure 29: History Setup screenshot – part 1

Figure 30: History Setup screenshot – part 2

Figure 31: History Setup screenshot – part 3

3.5 Sensors History Erase

This option enables the user to erase all history sensors (see **Figure 32**). Select 'yes' to erase sensors history log. Select 'no' to go back to the history menu (table 3).

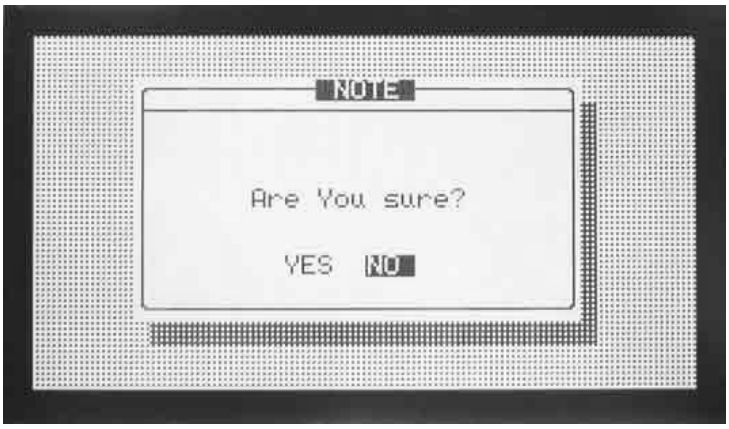


Figure 32: Sensors History Erase selection screenshot

3.6 Rain Collect History

This selection shows the quantity of rain in millimeters/inches per day (**Figure 33**). In order to change from mm. to inches go to menu **4.2.4** - weather sensors (see **Table 1**) and change the rain unit. The collection is according to 0.010 inches or 0.254mm per rain collector pulse. When you change the rain unit, prior collections will not be converted according to the change. Note that Rain history collection is up to 365 days back.

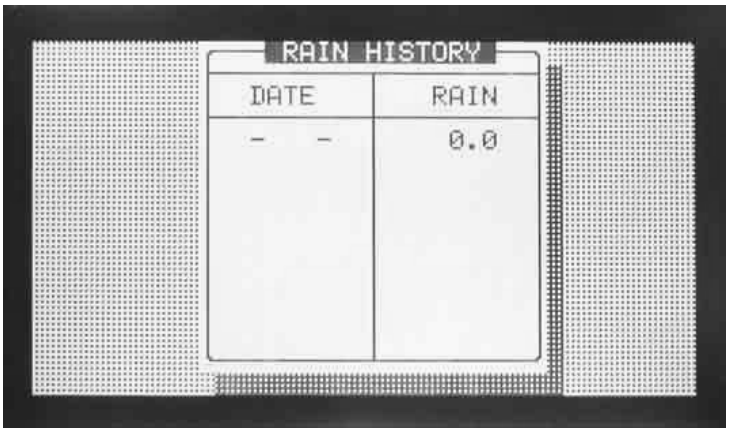


Figure 33: Rain History screenshot

4. Management

This menu contains items primarily related to proper management of your greenhouse. You can manage temperature units, and set basic functions such as time and date. You can also enter passwords and customize active and sensor windows. The management menu screen shows the following options (see **Figure 34**):

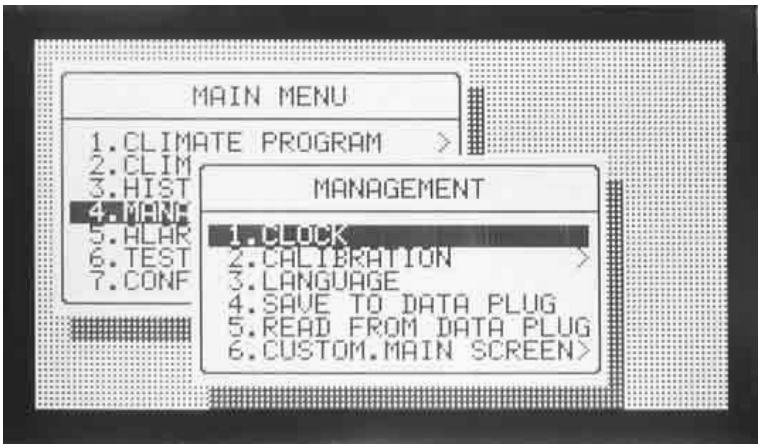


Figure 34: Management menu screenshot

4.1 Clock

This option (see **Figure 35**) allows the user to adjust both the date and time. Moreover, it allows the user to define day and night times according to the following:

- To adjust the **time** and **date** simply place the cursor on the row you want to change, change the numbers using the number keys and press enter to move and save your changes.
- **BEGIN DAY/NIGHT -** Define day and night times according to season, or any other suitable setting. Default day time is from 06:00 to 18:00 and night time is from 18:00 to 06:00.

Figure 35: Clock screenshot

4.2 Calibration

This menu contains items that deal with calibration of the sensors connected to the NMC-Junior Climate and with the controller itself. Make sure that both the sensors and the controller are giving precise measurements.
The calibration menu consists of the following options (see **Figure 36**):

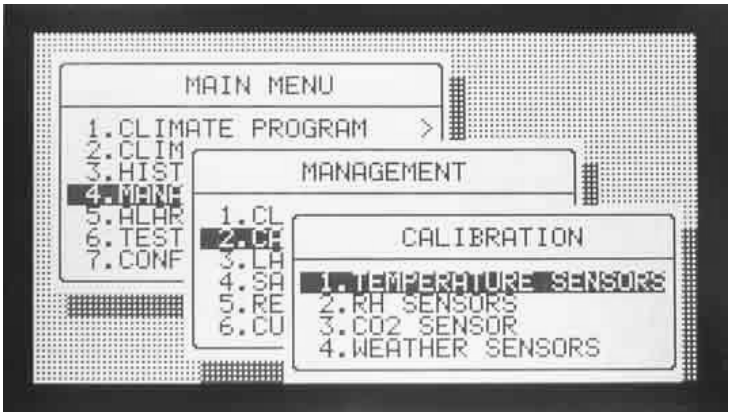


Figure 36: Calibration menu screenshot

4.2.1 Temperature Sensors

This option allows the user to do the following (see **Figure 37**):

- To perform a good calibration the sensor environment must be stable therefore the calibration should take place early in the morning, before sunrise or in the evening after sunset.
- Use a thermometer and take the current temperature. Wait 5-10 minutes for the temperature gage to stabilize (keep the measuring point away from body heat).
- Enter the results in the factor column in the proper sensor line.

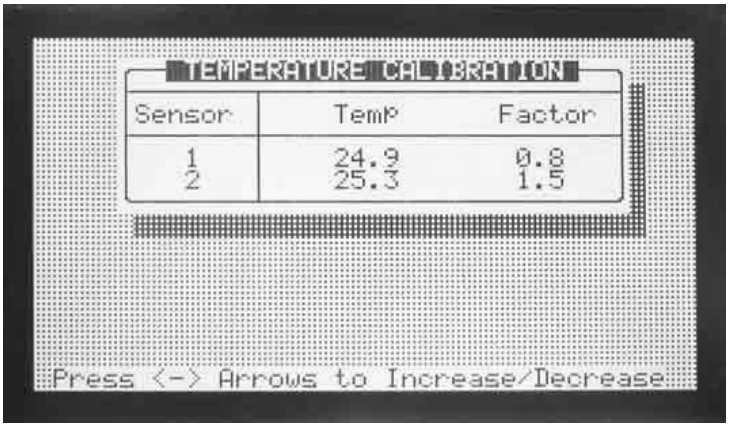


Figure 37: Temperature Calibration screenshot

4.2.2 RH Sensors

The RH calibration isn't an easy task due to the difficulty to measuring relative humidity using a manual reference instrument. We recommend using a wet dry spinner (see **Figure 38**). Note the following:

- Perform the humidity test next to the sensor that needs to be calibrated.
- Record and write the humidity value in the calibration column (Factor) for the proper sensor. Continue to calibrate each sensor the same way.

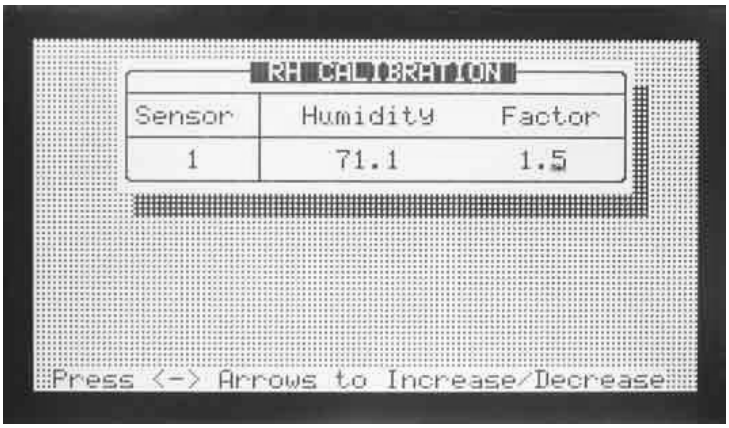


Figure 38: RH Calibration screenshot

4.2.3 CO2 Sensor

This selection enables the user to calibrate the CO2 sensor (see **Figure 39**). The parameters are explained below.

- **Ppm at 4/20 mA** - Parts per million for 4 mA and 20 mA.
- **CO2 (ppm) -** Current CO2 readings.
- **Factor (ppm)** - (-/+) ppm from the current reading.

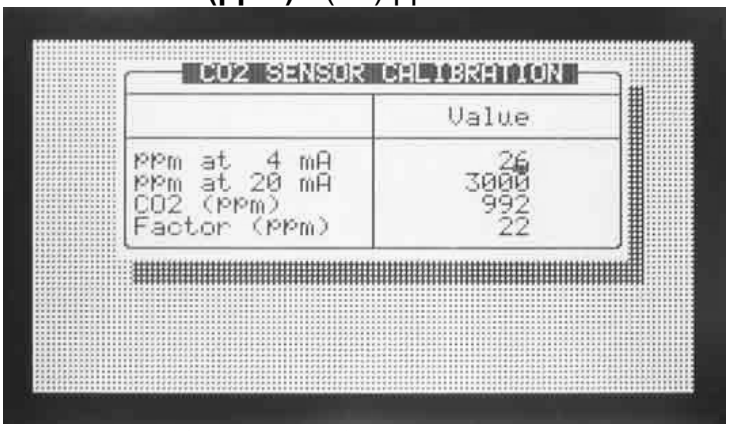


Figure 39: CO2 Sensor Calibration screenshot

4.2.4 Weather Sensors

This selection allows the user to calibrate the weather sensor (see **Figures 40-41**). Its parameters are as follows:

- **Radiation Type** – select between Davis and Netafim sensors according to the installed sensor.
- **Radiation Offset** – Fine tuning of the radiation value.
- **Radiation Factor** – The radiation sensor factor should be set as indicated in the calibration sticker supplied with the sensor.
- **Direction Factor** - The direction factor is set by the user, primarily according to the directions of the house. The wind program uses the factor as an orientation point. To set the factor, choose the '0' point and set the wind direction sensor to it. Change the direction factor to 0.
- **Speed Unit** – Select either kilometers per hour or miles per hour.
- **Rain Unit** – Select between millimeters or inches.
- **Qty. per pulse** – Set the quantity of rainfall to be regarded as a pulse. You can increase or decrease this set quantity to calibrate your system, according to an outside independent rainfall measurement instrument.
- **RH% 0.00 Factor** – Set the relative humidity factor according to the reading of an *outside humidity sensor*

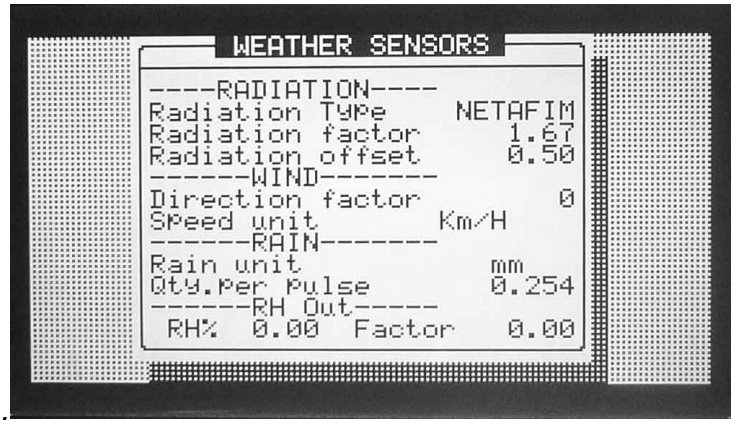


Figure 40: Weather Sensors screenshot – part 1

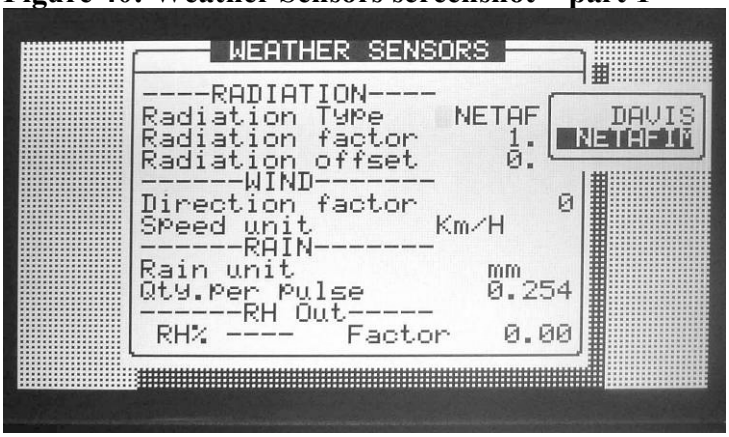


Figure 41: Weather Sensors screenshot – part 2

4.3 Language

This selection enables the user to select a desired language (see **Figure 42**). Press Enter for the language selection to appear, select a language using the arrow keys and Enter to save your selection.

Figure 42: Language screenshot

4.4 Save to Data Plug

This option allows the user to save the information to a data plug. Place the plug in its socket and save the current data from the controller (see **Figure 43**). The new data will overwrite the old data on the plug.

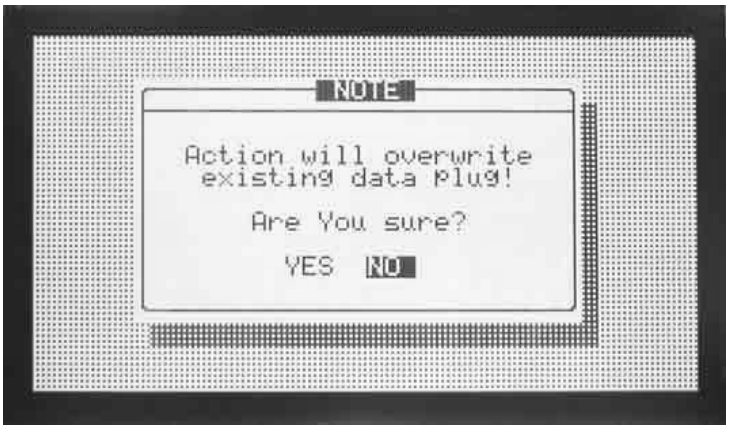


Figure 43: Save to data plug screenshot

4.5 Read from Data Plug

This selection allows the user to read information from data plug. Place the plug in its socket and download data from the plug to the controller (see **Figure 44**). The new data will overwrite the existing data on the controller.

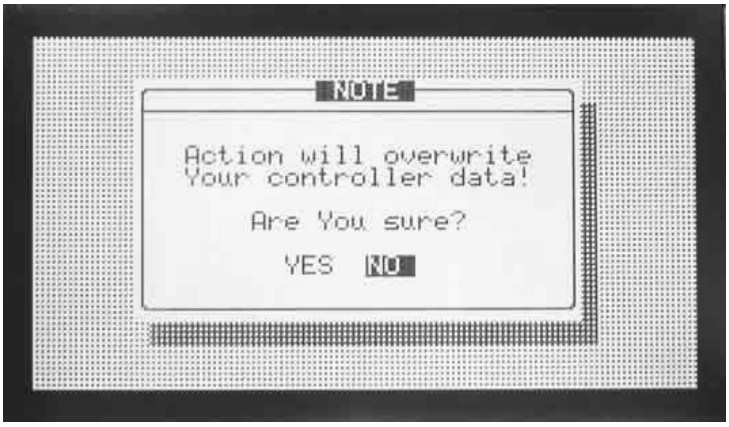


Figure 44: Read from data plug screenshot

	Do not leave Data plug in socket when not in use.
	Do not save or load to plug when the process is in action – the controller is halted for a few seconds

4.6 Customize Main Screen

The Customize main screen option enables the user to select the information that is shown on the main screen (see **Figure 45**). The sensors option refers to the sensors part of the main screen (see Main screen). The active option refers to the active part of the main screen.

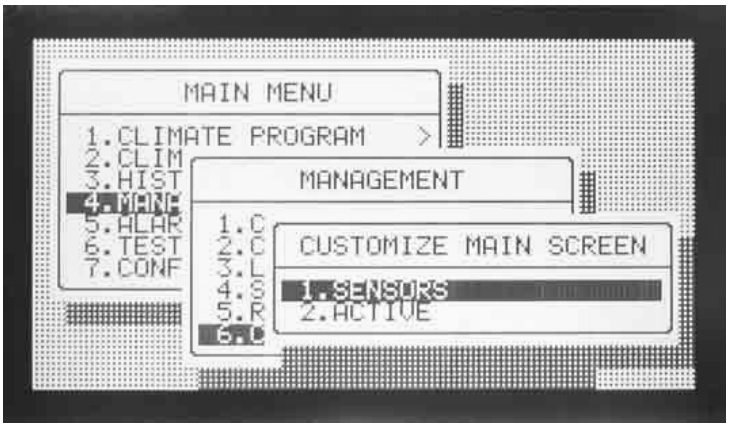


Figure 45: Customize Main Screen menu screenshot

4.6.1 Sensors

Press 'Enter' when entering the Customize Sensor Window and a small table with all of the sensors' names will pop up. Then select the desired instrument and press Enter again to save your choice. Go to any line and select a required sensor to be shown on the main screen the same way. If many sensors have been selected, and you do not see them right away on the main screen, wait a while until the other sensors show (see **Figure 46**).

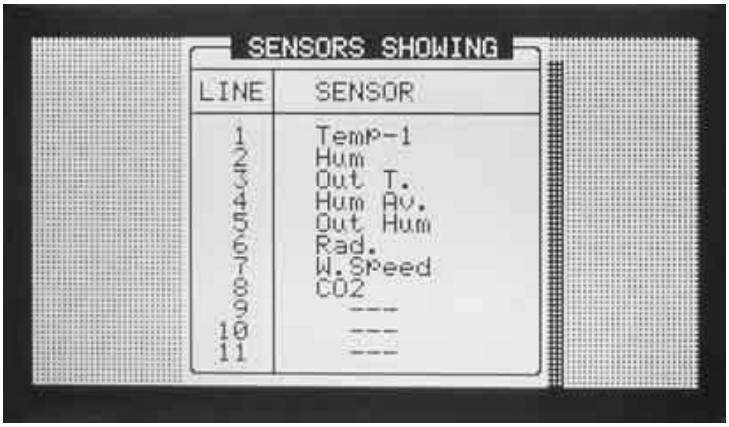


Figure 46: Sensors showing screenshot

4.6.2 Active

Press 'Enter' when entering the Customize Active Window and a small table with the instruments names will pop up. Then select the desired instrument and press Enter again. There up to 14 spaces and the order of appearance on the main screen will identical to the one in here (see **Figure 47**).

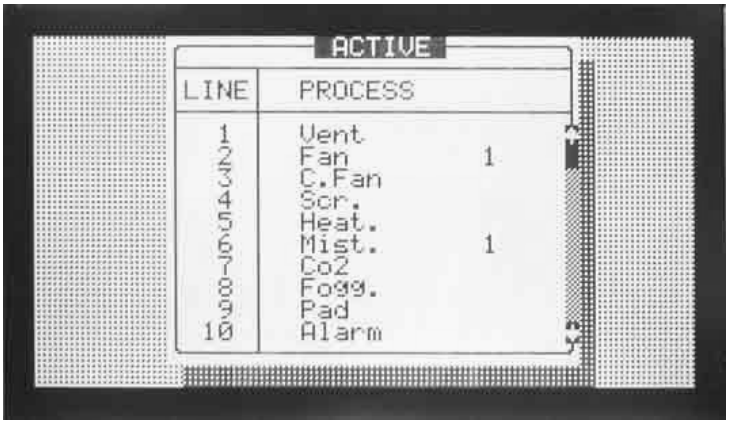


Figure 47: Active screenshot

5. Alarm

To reach the Alarm Menu from the Main Menu screen choose one of the following options; either press numeric key 5 or navigate to line number 5 and press Enter. The following options are displayed (see **Figure 48**):

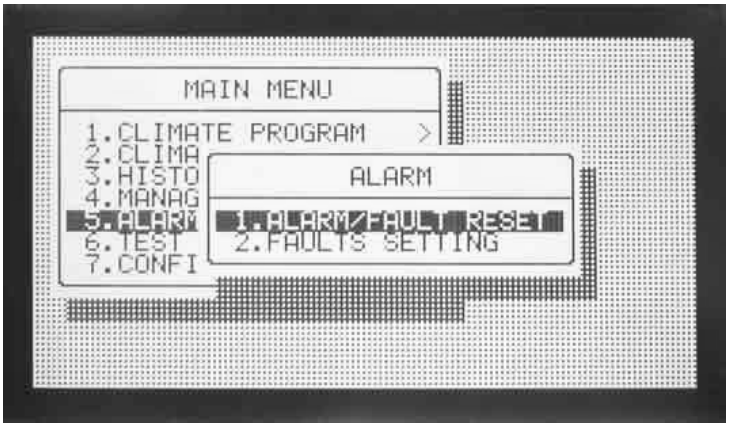


Figure 48: Alarm menu screenshot

5.1 Alarm/Fault Reset

This table shows active alarms and faults. The bottom part allows the user to cancel faults and reset the alarms (see **Figure 49**).

Figure 49: Alarm/Fault Reset screenshot

5.2 Faults Setting

This table shows fault setting alarms (see **Figure 50**). Its parameters are as follows:

- **High t º** - Define high temperature alarm. If temperature exceeds high t º definition, alarm will activate.
- **Low t º** - Define low temperature alarm. If temperature drops below low tº definition, alarm will activate.
- **High %RH** – Define high humidity alarm. If temperature exceeds high %RH definition, alarm will activate.
- **Low %RH** – Define low humidity alarm. If humidity drops below low %RH definition, alarm will activate.
- **High Wind** – Define high wind speed. If wind speed exceeds high wind definition alarm will activate.
- **CO2 High** – Define high CO2 alarm. If gas exceeds high CO2 definition, alarm will activate.

	Delay Time – The duration in seconds of one of the faults above, prior to alarm activation.

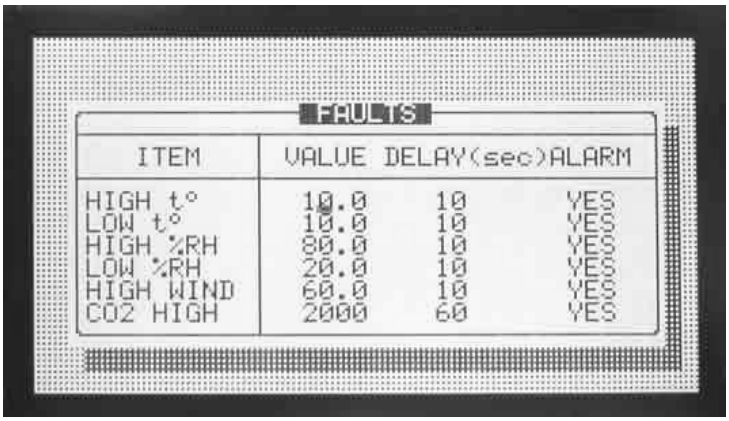


Figure 50: Faults screenshot

6. Test

Go to the Test menu by either pressing number 6 on the numeric keypad or navigate to line number six using the up/down arrow keys and press enter. The following screen appears (see **Figure 51**):

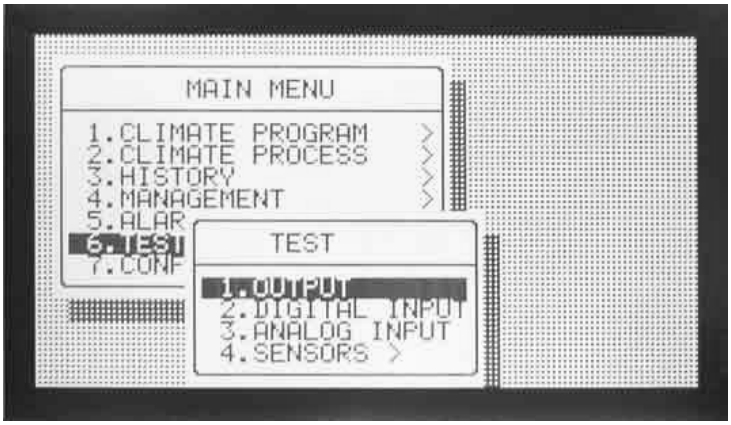


Figure 51: Test menu screenshot

6.1 Output

To test relays function, mark the relays you wish to test and use the right arrow keys to change the mark to '*'. Now the function should initiate activity in the same way that it would have been activated by a certain program. To stop testing, press the left arrow key. Use the test feature to make sure all connections have been made properly (see **Figures 52-53**).

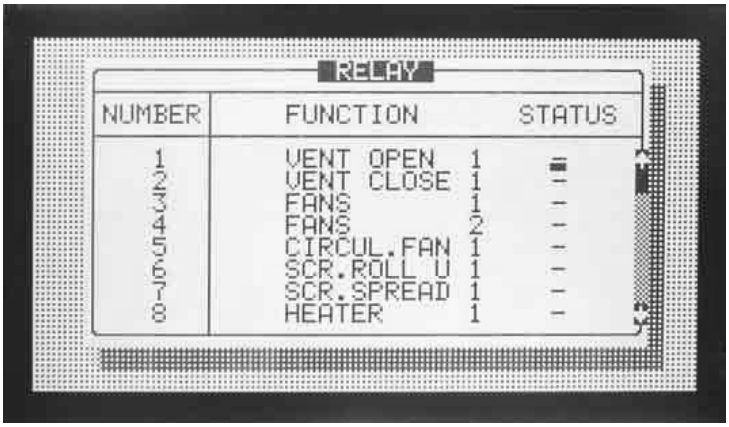


Figure 52: Output screenshot – part 1

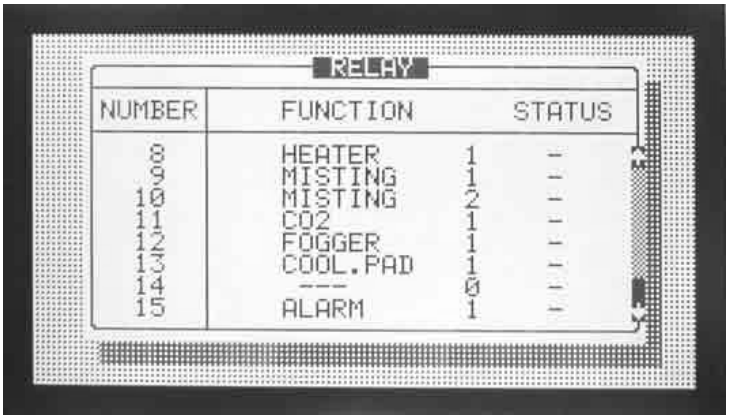


Figure 53: Output screenshot – part 2

6.2 Digital Input

Use this menu in order to test sockets manually. In order to test the socket, create a short circuit in one of the terminals. If the socket is functioning well, the input number will change from 0 to 1 (see **Figure 54**).

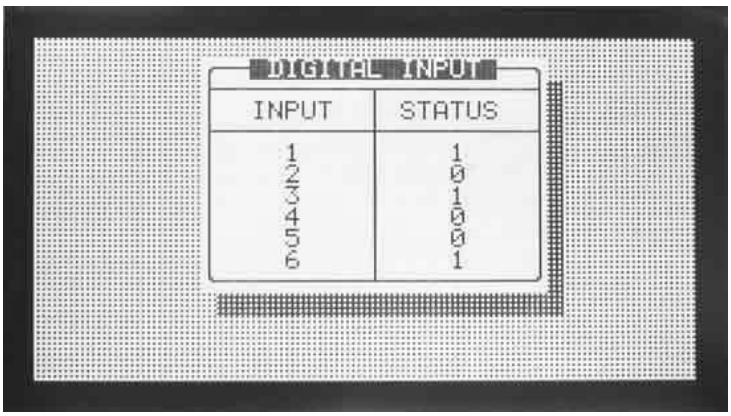


Figure 54: Digital input screenshot

6.3 Analog Input

Use this menu in order to test sockets manually. In order to test the socket, create a short circuit in one of the terminals (see **Figure 55**).

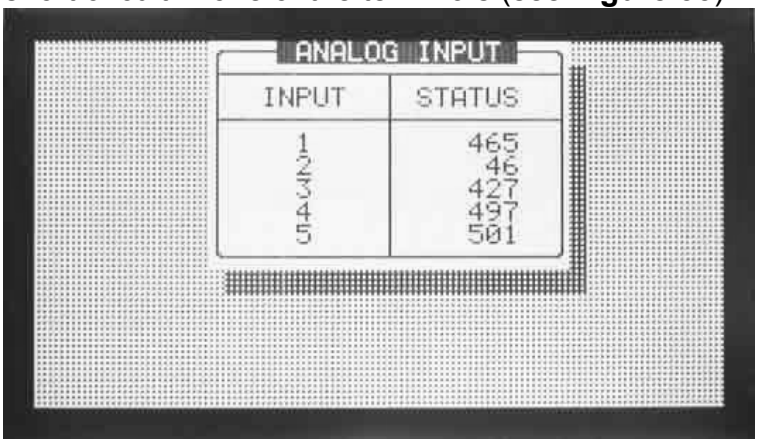


Figure 55: Analog Input screenshot

6.4 Sensors

Choosing this option leads to the following screen (see **Figure 56**):

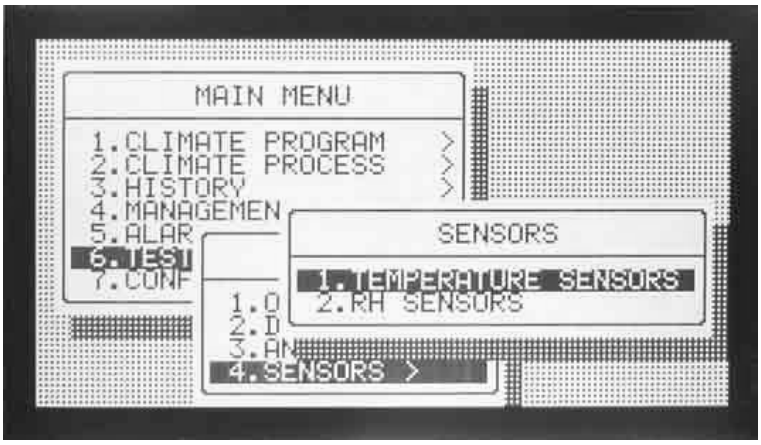


Figure 56: Sensors menu screenshot

6.4.1 Temperature Sensors

Readings from each temperature sensor are displayed in **Figure 57**.

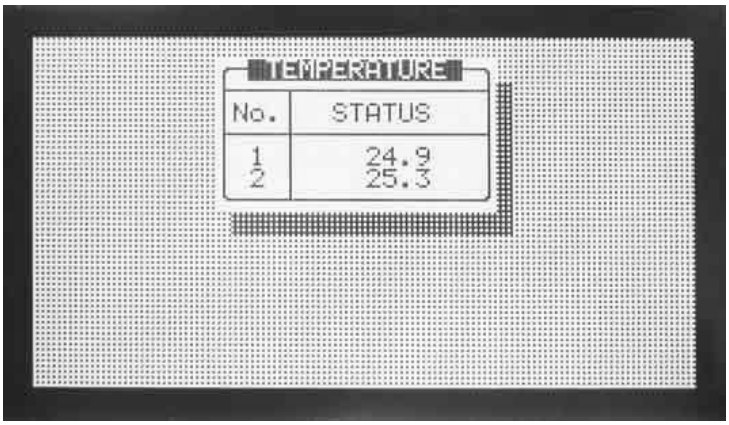


Figure 57: Temperature sensors screenshot

6.4.2 RH Sensors

Readings from each humidity sensor are displayed in **Figure 58**.

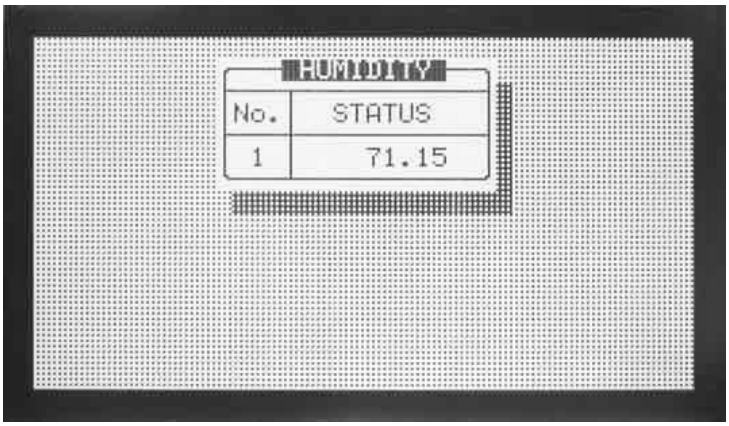


Figure 58: RH sensors screenshot

7. Configuration

Go to the configuration menu by either pressing number 7 on the numeric keypad or by navigating the line number (seven) by using the up/down arrow keys and pressing Enter (see **Figure 59**). The configuration menu is primarily a setup menu for the NMC-Junior Climate. That's why in the beginning of the software chapter it is recommended to start with this menu. Besides settings and definitions, the configuration menu includes the wind program and vents operation program.

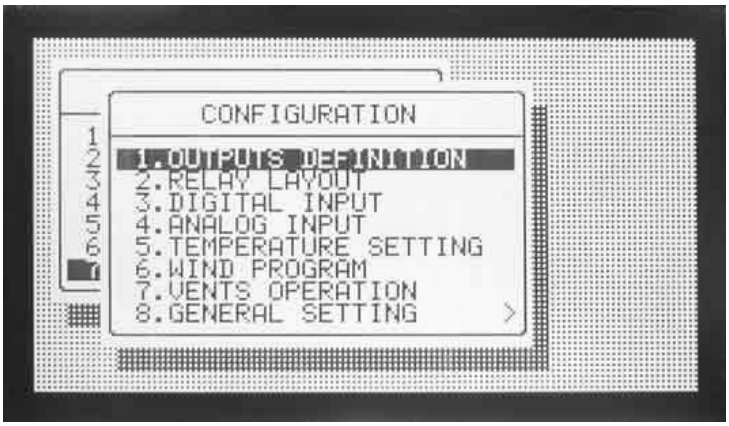


Figure 59: Configuration menu screenshot

7.1 Outputs Definition

Figure 60 appears. Fill in the definitions according to the equipment you have connected to the **NMC-Junior Climate.** The equipment that is being used on the field can be controlled if connected to the **NMC-Junior Climate** outputs. An output is basically a relay. For example, if there are 1 fans functioning, the number of functions on fans outputs can be set on 1.

	NOTE: The satellite line represents the amount of relays not in use. Any configuration will deduct the initial amount chosen.

Once you've defined the outputs press the menu key to exit, choose one of the following options (see **Figure 61**):

- Select the **Auto** option if you want the NMC-Junior Climate to lay out the relays according to the equipment plugged in automatically.
- Select the **Manual** option if you want the lay out the relays manually.
- Select the **Cancel** option if you want to go back to the main screen configuration menu. The controller did not lay out the relay.

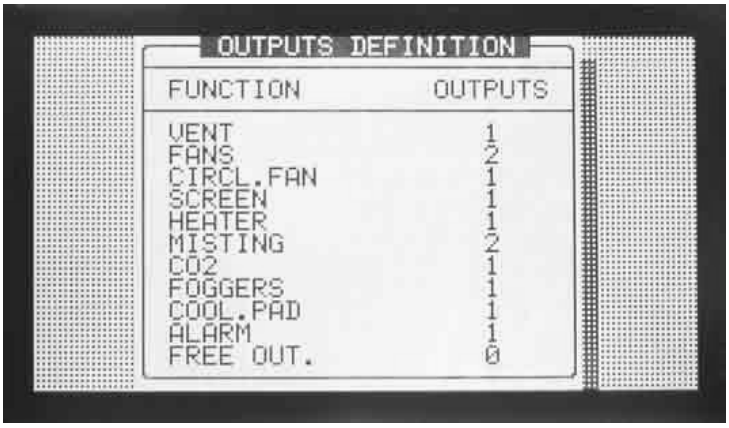


Figure 60: Outputs Definition screenshot

Figure 61: Relay Layout screenshot – after pressing 'MENU'

7.2 Relay Layout

After setting the output definition, go to the relay layout window. Attach a function to a relay. If you selected the auto option as mentioned earlier the relay layout will be set automatically, but it can also be changed manually (see **Figures 62-64**).

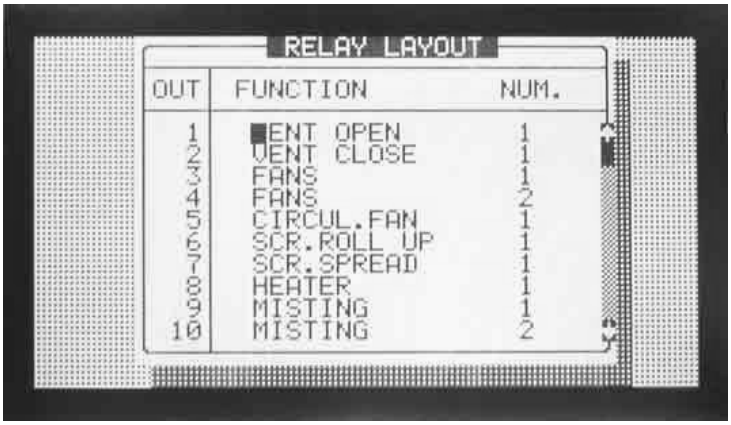


Figure 62: Relay Layout screenshot – part 1

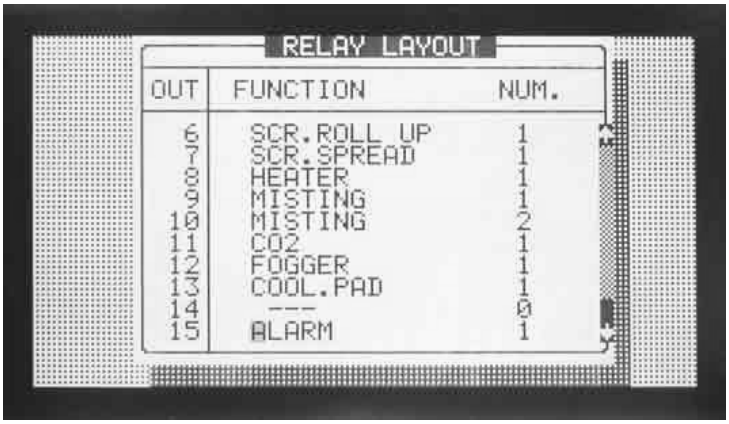


Figure 63: Relay Layout screenshot – part 2

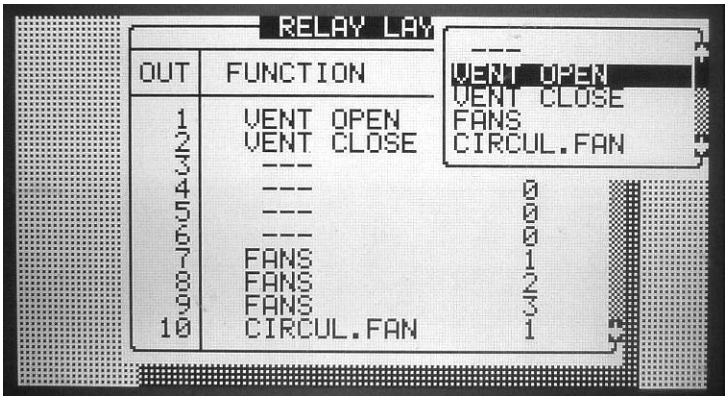


Figure 64: Relay Layout after selecting 'Manual' option screenshot

7.3 Digital Input

Mark a function and press 'Enter'. The cursor will shift to the next row. To confirm your change select 'yes' in the save changes screen that appears afterwards (**Figures 65-66**).

Figure 65: Digital input screenshot

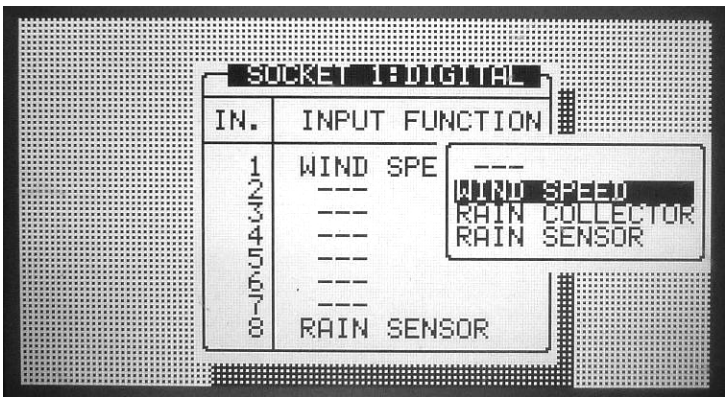


Figure 66: Digital Input menu screenshot

7.4 Analog input

There are 5 inputs on an analog. For every row choose whether 'Yes' or 'No' according to the inputs connected and press Enter. The marker will shift to the next row. Program is according to equipment that is connected to the **NMC-Junior Climate** (see **Figures 67- 68**).

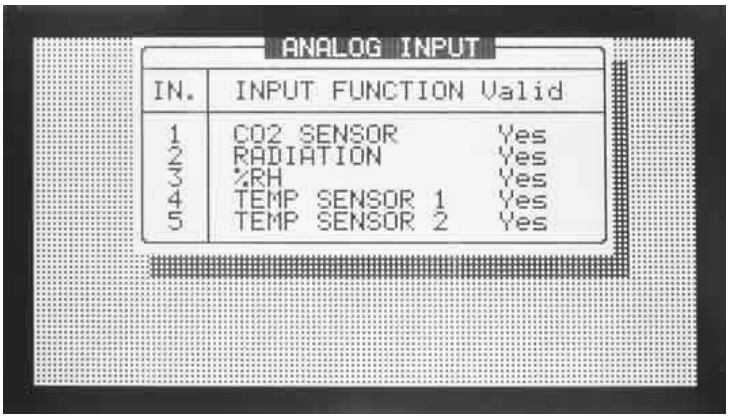


Figure 67: Analog Input screenshot

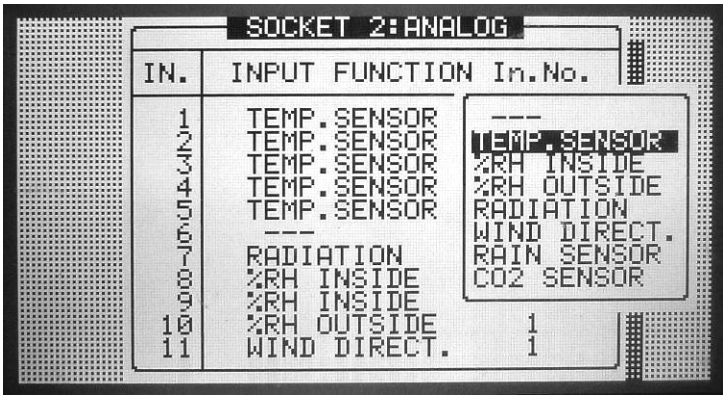


Figure 68: Analog Input menu screenshot

7.5 Temperature Setting

This option allows the user to set the temperature sensors (see **Figures 69-70**).

	Select a temperature sensor for each of the functions, the function uses the average temperature reading from sensors defined in this table, throughout the different climate programs and processes.

- **FUNCTION** – equipment that has been defined up until this point through the configuration process.
- **INSIDE/OUTSIDE** – select number of sensors for inside and outside average temperature calculation.
- **TEMPERATURE SENSORS** – Every process and equipment operates with their sensor's number. If two numbers exist, the average will be calculated. If no number exists, it operates according to its average Inside.

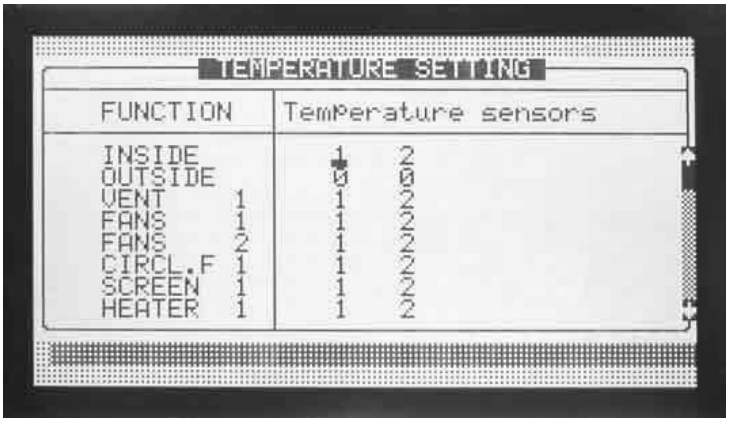


Figure 69: Temperature setting screenshot – part 1

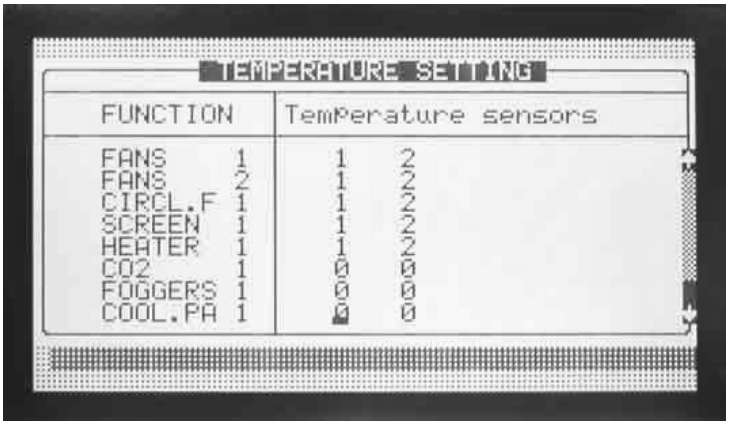


Figure 70: Temperature setting screenshot – part 2

7.6 Wind/Rain Program

This table allows you to control the vents operation according to wind speed, wind direction and rain. To operate this feature, the system must have a weather station sensor.

The program default settings are automatically filled with all the available options except of the wind Speed and opening % in the Program (P1…4) column. For every option fill in low and high wind speed values. The controller will calculate a curve between the high and low values. Options with wind direction set to "yes" will operate according to wind direction of each of the vents set in the vents setting menu. When set to OFF ("no") the wind direction will not play a roll in the program activation. For each wind/rain status there are 4 programs. On each program select opening % of the vents. The curve applies to the opening % in high and low speeds as well. When the table is full, it is time to appoint each vent to a desirable program in the vent operation menu. In case of rain, the wind speed and position automatically turn 0 and the vents close without delay (see **Figure 71**). Note that all the parameters are default. To build programs it is possible to change the parameters: Wind speed and opening percentage.

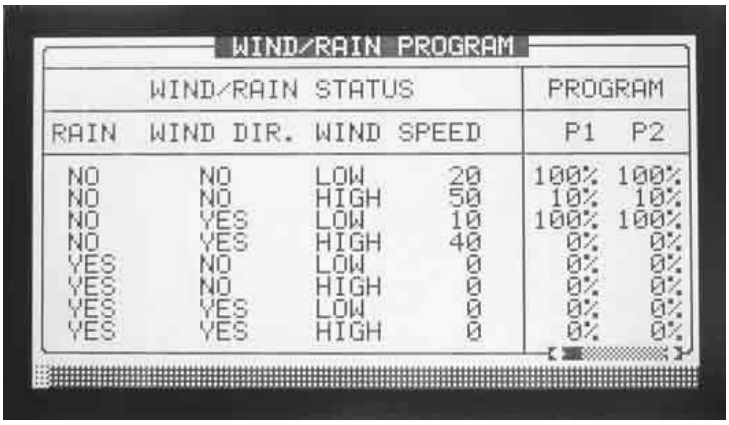

WIND/RAIN PROGRAM
WIND/RAIN STATUS
PROGRAM
RAIN WIND DIR. WIND SPEED P1 P2
NO NO LOW 20 100% 100%
NO NO HIGH 50 10% 10%
NO YES LOW 10 100% 100%
NO YES HIGH 40 0% 0%
YES NO LOW 0 0% 0%
YES NO HIGH 0 0% 0%
YES YES LOW 0 0% 0%
YES YES HIGH 0 0% 0%

Figure 71: Wind/Rain Program screenshot

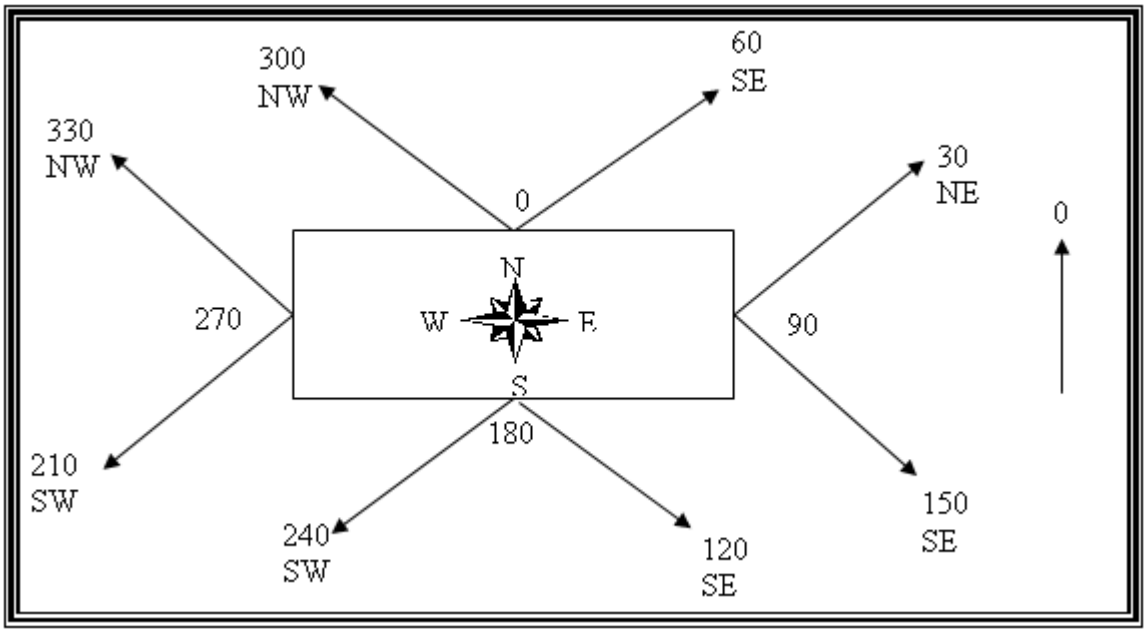


Figure 72: Wind direction diagram

7.7 Vents Operation

Set the following parameters for each vent (see **Figures 73-74**). The vents activity throughout the different climate programs and processes, functions according to these configurations.

- **OPENING TIME** – Enter how long it takes the vent to fully open from a fully closed position. The time value is in seconds.
- **CLOSING TIME** – Enter how long it takes the vent to fully close from a fully open position. The time value is in seconds.
- **% MIN STEP SIZE** – Define the minimum percentage for opening/closing the vent from the current position to the calculated. If calculated position percentage is below this percentage, then the vent will not increase/decrease position.
- **DELAY TIME (sec.)** – Set the delay time you want between each of the vents' steps.
- **% DURING FAN** – Define the opening percentage during fan operation.
- **% MIN. DURING RH** – Set minimum opening percentage during humidity treatment.
- **% MIN. DURING PAD** – Set the minimum opening percentage during cooling pad operation.
- **WIND PROGRAM NUMBER** – Define a vent to one of the four wind programs according to the wind direction diagram seen in **Figure 77**. Choose one of the 4 wind programs in the wind program table. You can

program up to 4 programs and in this screen it can be seen which one is operating.

- **WIND DIRECTION FROM/TO** – Configure the range of degrees the vent is facing. The 0 degree factor is set in the weather sensors table.
- **WAIT WIND SPEED RISE/DROP (sec.)** – Set vents opening delay time in seconds when the wind speed either rises or drops.
- **NUM. STAGES WIND SPEED** - The NMC-64 CLIMATE forms a curve between wind speed and vents opening percentage in the Wind Program (7.5) and here you decide in how many stages you want the vents to open/close during wind program activity.

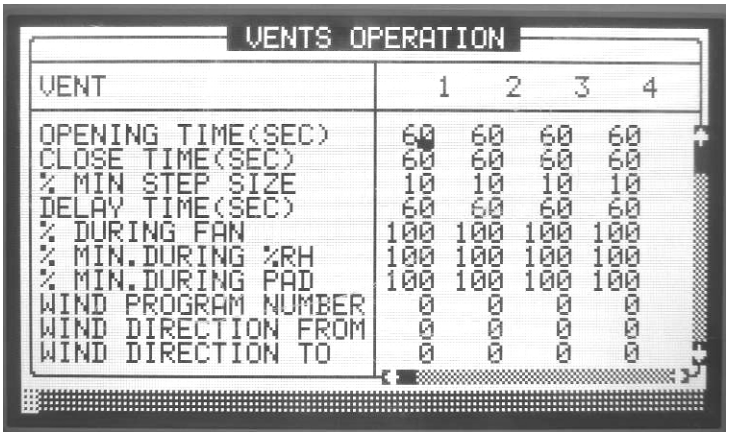

VENTS OPERATION
VENT 1 2 3 4
OPENING TIME(SEC) 60 60 60 60
CLOSE TIME(SEC) 60 60 60 60
% MIN STEP SIZE 10 10 10 10
DELAY TIME(SEC) 60 60 60 60
% DURING FAN 100 100 100 100
% MIN.DURING %RH 100 100 100 100
% MIN.DURING PAD 100 100 100 100
WIND PROGRAM NUMBER 0 0 0 0
WIND DIRECTION FROM 0 0 0 0
WIND DIRECTION TO 0 0 0 0

Figure 73: Vents Operation screenshot – part 1

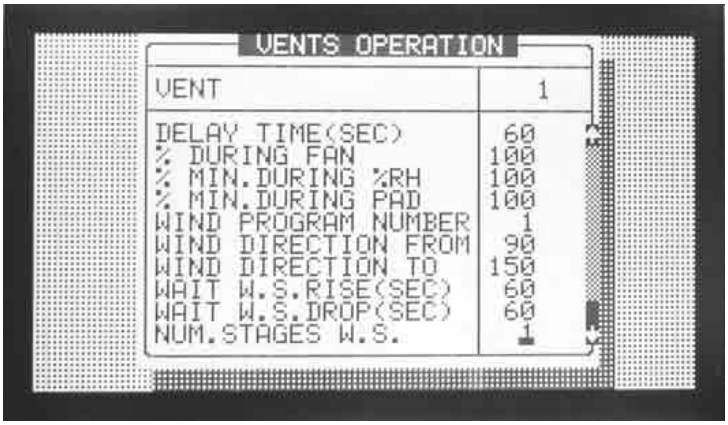


Figure 74: Vents Operation screenshot – part 2

7.8 General Setting

This menu is shown in **Figure 75**.

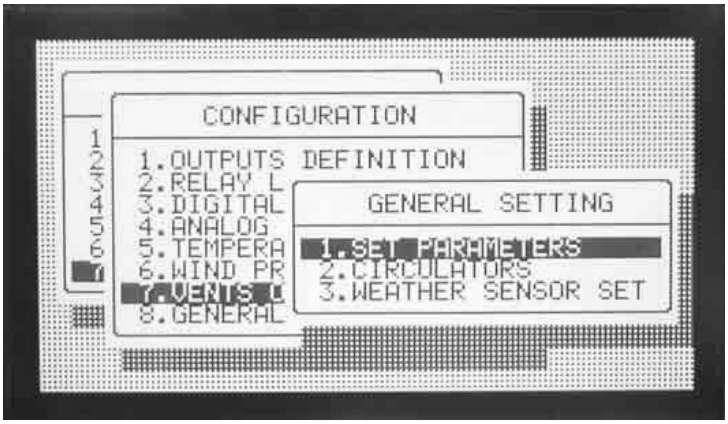


Figure 75: General Setting menu screenshot

7.8.1 Set Parameters

This selection enables the user to set parameters (see **Figures 76-77**). They are explained below.

- **MAX ACTIVE MIST -** Maximum misting to operate at the same time.
- **HISTORY RESOLUTION -** History collection cycle time.
- **RAIN SENSOR DELAY –** Delay time between rain detection and alerting. This feature is meant to avoid false alarms if the sensor got wet with humidity or as a result of a mistake etc.
- **RAIN SENSOR LEVEL (A/D) -** This parameter relates to analog rain sensors with analog outputs. (For example: 0V-No rain, 3V-Rain) that can be connected to the NMC-Junior Climate analog input. The A/D level determines above which point there is rain and below which point there is no rain.
- **BAUDRATE -** Communication BAUDRATE that must be correspondent to the BAUDRATE in the communication software.
- **CONTROLLER NUMBER** - Must be correspondent to the number in the communication software.
- **TEMPERATURE UNIT -** Select between Celsius and Fahrenheit.
- **CONTROLLER FUNC. - WEATHER ST., –** If set to **Slave**, the function will operate according to the master's permission (in weather station it receives the data from the master).
  If **Local**, it operates independently. It receives the physical data from its sensors that are connected physically.
- **CONTROLLER FUNC. – Fogging –** If set to **Slave**, if there are conditions to start the Fogging, it waits until the **Master** enables it to begin to operate the process.
  If **Local**, the controller operates independently, it begins fogging when its conditions match.

- **CONTROLLER FUNC. - Misting –** If set to **Slave**, if the time fits to start the misting process, it waits until the **Master** enables it to begin to operate the process.
  If **Local**, the controller operates independently, it begins misting when its time matches.
- **MAX WAIT ALARM FOG/MIST (MIN) –** If during the time defined, it does not receive any confirmation from the **Master**, an alarm is activated. Maximum value is 1440.

It is very important to configure table 1.5 and 1.7 in a way that there is a gap (of at least 1 second) between one relay sequence to the next one.

No controller in the net should have a “controller number” that is higher than “Max controllers in the net”

The more controllers are in the net the longer it takes to switch permission from one to the other.

When a controller is defined as local, it will disregard the net and operate independently.

It is not permitted to have two identical controller numbers on the same network.

Figure 76: Set Parameters screenshot – example 1

Figure 77: Set parameters screenshot – example 2

7.8.2 Circulators

Select Circulators operation (yes/no) status during heating and cooling processes (see **Figure 78**).

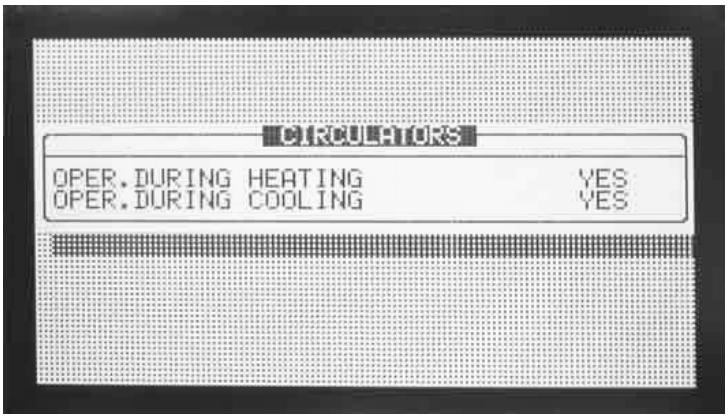


Figure 78: Circulators screenshot

7.8.3 Weather Sensor Set

In case of **Slave** choice (table **7.8.1**): Mark a '√' near the information you want the NMC-Junior Climate to receive (see **Figure 79**).
In case of **Local** choice (table **7.8.1**) – N/A, since there is no connection to meteorology station.

Figure 79: Weather sensor set screenshot